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Checklists of the Ceraphronoidea, Cynipoidea, Evanioidea, Stephanoidea and Trigonalyoidea (Hymenoptera) of Canada, Alaska and Greenland

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Abstract

Distributional checklists of the extant, described species of five superfamilies of Hymenoptera of Canada, Alaska and Greenland are presented. In total, 296 species in 79 genera in 12 families are recorded: 55 species of Ceraphronoidea, classified in 10 genera in 2 families, 205 species of Cynipoidea in 58 genera in 5 families, 30 species of Evanioidea in 5 genera in 3 families of Evanioidea, 2 species of Stephanoidea in 2 genera in 1 family and 4 species of Trigonalyoidea in 4 genera in 1 family. Of the reported species, 281 (in 79 genera in 12 families) are listed from Canada, 31 (in 16 genera in 6 families) from Alaska, and 7 (in 5 genera in 2 families) from Greenland. The list includes 8 new generic records for Canada (1 Ceraphronoidea, 6 Cynipoidea and 1 Evanioidea) and 43 new Canadian species records (13 Ceraphronoidea, 28 Cynipoidea and 2 Evanioidea). For each species in Canada, distribution is tabulated by province or territory, except the province

† Deceased.

of Newfoundland and Labrador is divided into the island of Newfoundland and the region of Labrador. These checklists are compared with previous Nearctic and Palaearctic surveys, checklists and catalogues. *Kleidotoma minima* Provancher, 1883 (Figitidae) is moved from this genus to *Hexacola* Förster, 1869 to form *H. minimum* (Provancher, 1883), **comb. nov.** *Amblynotus slossonae* Crawford, 1917 (Figitidae) is moved from *Melanips* Walker, 1835 to *Amphithectus* Hartig, 1840 forming *A. slossonae* (Crawford, 1917), **comb. nov.**

Keywords
Hymenoptera superfamilies, northern North America, species distributions

Introduction

Following publication of the introduction of the checklists of the Hymenoptera of Canada, Alaska and Greenland (Bennett 2021) as well as the checklists of the sawflies (Goulet and Bennett 2021) and the Chalcidoidea and Mymarommatoidea (Huber et al. 2021), the fourth installment in the series presents checklists of five more superfamilies. Most species in this paper (205 of 296) belong to the Cynipoidea, but species of four relatively small superfamilies (at least in terms of described species in the northern Nearctic region) are also included, rather than deal with these in one or more separate papers. Other than the total species counts detailed in Tables 1, 2 and the summary, each superfamily is treated separately.

Ceraphronoidea

Ceraphronoidea (Figs 4–9) is a cosmopolitan, but relatively poorly studied superfamily classified in two extant families: Ceraphronidae and Megaspilidae (Johnson and Musetti 2004). Species are small-bodied (5 mm or less), predominantly black (not metallic) with reduced wing venation (lacking closed cells) (Figs 4, 5). In this respect, they superficially resemble Scelionidae (Platygastroidea) and non-metallic Chalcidoidea. See Goulet and Huber (1993) for characters to distinguish these three superfamilies. Ceraphronoidea have been reared from many insect orders and with varied life histories. Within Ceraphronidae, *Aphanogmus thylax* Polaszek and Dessart was reared as an obligate hyperparasitoid of bagworm larvae (Lepidoptera: Psychidae) via *Dolichogenidea metesae* (Nixon) (Hymenoptera: Braconidae), but also via a tachinid fly (Diptera: Tachinidae) (Kamarudin et al. 1996), *A. flavigastris* Matsuo has been reared as a solitary or gregarious parasitoid of gall midges (*Feltiella* spp.) (Diptera: Cecidomyiidae) (Matsuo et al. 2016), *A. albicoxalis* Evans and Dessart was reared as a gregarious ectoparasitoid of prepupae and pupae of cybocephalid beetles (Coleoptera: Cybocephalidae) (Evans et al. 2004) and an undescribed species has been reared as an ectoparasitoid of pupae of caddisflies (Trichoptera: Hydroptilidae) (Luhman et al. 1998). Within Megaspilidae, species of *Conostigmus* Dahlbom (Fig. 7) have been most commonly reared as solitary endoparasitoids in puparia or pupae of Diptera (Kamal 1926 in Syrphidae; Guppy 1961 in Cecidomyiidae). *Conostigmus* species have also been reared as endoparasitoids of a snow scorpionfly (Mecoptera: Boreidae) (Cooper and Dessart 1975) and have been collected

from nests of ants (Hymenoptera: Formicidae) (Panis 2008). See Trietsch et al. (2020) for a summary of known biology of *Conostigmus*. Species of the sister genus *Dendrocerus* Ratzeburg (Fig. 8) have been reared as gregarious ectoparasitic hyperparasitoids developing on prepupae and pupae of the primary parasitoid *Aphidius* spp. (Hymenoptera: Braconidae) inside mummies of parasitized aphids (Hemiptera: Aphididae) (Haviland 1920; Fergusson 1980; Mackauer 2017). Rearings of ceraphronoids from Neuroptera and Thysanoptera are also reported (Johnson and Musetti 2004), for example *D. conwentziae* Gahan (Fig. 8) has been reared from a dustywing *Conwentzia* sp. (Neuroptera: Coniopterygidae) (Muesebeck 1979).

The phylogenetic placement of Ceraphronoidea within Hymenoptera has been historically equivocal (see Heraty et al. 2011; Sharkey et al. 2012). Recent molecular-based study places Ceraphronoidea as the sister group of Ichneumonoidea (Peters et al. 2017) or as sister group to Evanioidea + Stephanoidea (Blaimer et al. 2023). In terms of previous surveys, Johnson and Musetti (2004) published a world catalog with species distributions by region that totalled 603 extant described species up to September 2003. Muesebeck (1979) provided the last catalogue for North America north of Mexico including distributions by state and province. Masner et al. (1979) summarized the species number of Ceraphronoidea for Canada and this was updated by Bennett et al. (2019). Buhl (2015) listed the species from Greenland. For identification, Dessart and Cancemi (1987) provided keys to world genera.

Cynipoidea

Cynipoidea (gall wasps and allies) (Figs 10–33) is a moderately diverse superfamily. There are about 3200 described species globally (Huber 2017) currently classified into 7 extant families (Buffington et al. 2020; Hearn et al. 2024). Austrocynipidae has only 1 species from Australia (Ronquist 1999) and Ibaliidae is known from 20 extant species in 3 genera in the Holarctic and Oriental regions including Papua New Guinea (Nordlander et al. 1996; Liu 1998; Buffington et al. 2020). Liopteridae is moderately speciose with 175 species in 10 genera and most species are tropical or subtropical (Buffington et al. 2020). Figitidae is the largest family, but also the most poorly known, with estimates of described species ranging from 1423 (Buffington et al. 2020) to 1570 (Huber 2017), depending on differing opinions on the validity of some taxa. The family is cosmopolitan including species in the high Arctic. Until recently, there was only one other cynipoid family recognized: Cynipidae; however, the phylogenomic study of Blaimer et al. (2020) suggested the lack of monophyly of Cynipidae and more recent phylogenomic work by Hearn et al. (2024) formally divided Cynipidae into three families: Cynipidae *sensu stricto*, Diplolepididae (previously Cynipinae: Diplolepidini and Pediaspidini) and Paraulacidae (previously Cynipinae: Paraulacini). Following the removal of Diplolepididae and Paraulacidae, Cynipidae has more than 1400 described, extant species, all belonging to subfamily Cynipinae (Buffington et al. 2020). Diplolepididae has 63 described species in 4 genera including *Diplolepis* Geoffrey that has species in northern North America. Paraulacidae is comprised of two genera, each with three species, all from southern South America (Hearn et al. 2024). Within Hymenoptera, phylogenomic studies place Cynipoidea within the

"Proctotrupomorpha" with Chalcidoidea, Diaprioidea, Mymarommatoidea, Platygastroidea and Proctotrupoidea. Peters et al. (2017) found Cynipoidea to be the sister group to all other superfamilies within Proctotrupomorpha, whereas Blaimer et al. (2023) hypothesized that Cynipoidea + Platygastroidea was sister group to the other superfamilies.

Morphologically, cynipoids can generally be distinguished from other superfamilies by having moderately reduced wing venation with a characteristic, triangular, radial (= marginal) cell in the fore wing, as well as a laterally flattened metasoma and they generally lack metallic colouration (Ritchie 1993). They are also unique within Hymenoptera in that the radicle of the antenna is absent (not distinguishable from the scape) (Ronquist 1995). With respect to biology, Austrocynipidae, Ibaliidae and Liopteridae are parasitoids of wood-boring or cone-boring larvae of Lepidoptera, Hymenoptera or Coleoptera that pupate inside hard substrates and consequently have adaptations for boring in wood, for example, strongly sclerotized mandibles, transverse ridges on the mesoscutum and an elongate body (Ronquist 1999). Cynipidae, Diplolepididae, Figitidae and Paraulacidae have a characteristic high, compact mesosoma and short, rounded metasoma and lack the characteristics for living in wood (Ronquist 1999). Diplolepididae and most Cynipidae are gall makers (Shorthouse 2010; Melika and Abrahamson 2002) although some Cynipidae are phytophagous inquilines living in galls made by other insects (Ritchie 1993; Nastasi et al. 2024b). All Figitidae are parasitoids of larvae of Hymenoptera, Diptera or Neuroptera (Ronquist 1999; Buffington et al. 2020). Paraulacidae appear to be parasitoids of gall-inducing Melanosomellidae (Hymenoptera: Chalcidoidea) on southern beech (*Nothofagus*: Nothofagaceae) (Rasplus et al. 2022).

In terms of previous Nearctic catalogues and faunal surveys, Burks (1979) provided the last complete catalogue of all species of Cynipoidea of North America north of Mexico and various authors have published updated catalogues of particular groups, for example, a catalogue of the Nearctic rose gall, herb gall and inquiline gall wasps (Cynipidae and Diplolepididae) (Nastasi and Deans 2021) as well as illustrated keys to these groups in North America (Nastasi et al. 2024b). In addition, a world catalogue for Charipinae is available (Ferrer-Suay et al. 2012) and a Nearctic catalogue for Eucoilinae (Forshage et al. 2013). Masner et al. (1979) summarized the species numbers for Canada and these numbers were updated for Canada by Bennett et al. (2019) Vilhelmsen and Forshage (2015) summarized the Cynipoidea fauna of Greenland. With respect to taxonomic revisions, the Nearctic species of Ibaliidae are well-known (Liu and Nordlander 1992) as is the one genus of Liopteridae (*Paramblynotus* Cameron) known from northern North America (Liu et al. 2007). Within Cynipidae, many studies treating Nearctic species have been published in the last few years. For example, Melika and Abrahamson (2007) revised *Bassettia* Ashmead and Lobato-Vila and Pujade-Villar (2019) treated the tribe Ceroptresini including the genus *Ceroptres* Hartig, but some of the larger genera, e.g., *Andricus* Hartig (Fig. 11) and *Aulacidea* Ashmead (Fig. 13) have not been revised at all and some of those that have still require additional study (e.g., Nastasi et al. 2024c described an additional 22 species of *Ceroptres*, most of which are Nearctic and suggested that hundreds more undescribed species may be present in the genus). Some generic definitions may also require clarification (e.g., Cuesta-Porta et al.

2023 that resurrected *Druon* Kinsey out of *Andricus*). Finally, newly recognized associations of sexual and asexual forms, especially using DNA barcoding continues to result in new synonymies and new combinations (e.g., Nicholls et al. 2022), highlighting the taxonomic challenges of Cynipidae. In terms of Dipolepididae, some of the species definitions of *Diplolepis* Geoffrey (Fig. 15) also require clarification (Zhang et al. 2019). In Figitidae, two subfamilies have been the subject of several recent studies including revisions of all major genera: Aspicerinae (Ros-Farré and Pujade-Villar 2009a, 2011a, 2011b, 2013) and Charipinae (Paretas-Martinez et al. 2011; Ferrer-Suay et al. 2013, 2019). In contrast, the subfamily Anacharitinae has only been partially revised for the Neartic region (e.g., Mata-Casanova et al. 2014 for *Xyalaspis* Hartig), but other genera such as *Aegilips* Walker and *Anacharis* Dalman (Fig. 22) are in the process of being revised as of 2024. The majority of Nearctic species of Eucoilinae are still undescribed and working keys to all the Nearctic genera are not available (Forshage et al. 2013), although some genera have been revised for the region, for example, *Banacuniculus* Buffington (Buffington 2010a) and *Ganaspidium* Weld (Buffington 2010b). This is true as well for Figitinae, although some genera have been at least partially revised for the Nearctic including *Neralsia* Cameron (Jiménez et al. 2008a) (Fig. 29) and *Xyalophora* Kieffer and *Xyalophoroides* Jiménez and Pujade-Villar (Jiménez et al. 2008b) (Fig. 30).

Evanioidea

Evanioidea (ensign wasps and allies) (Figs 34–39) is a relatively small superfamily with 1,130 species globally (Huber 2017; Deans et al. 2023). It is mostly a tropical group with a limited number of taxa having ranges that extend to northern latitudes (Mason 1993; Bennett et al. 2019). There are three extant families (Li et al. 2018), all of which are present in northern North America: Aulacidae (Figs 34, 35), Evaniidae (ensign or hatchet wasps) (Figs 36, 37), and Gasteruptiidae (Figs 38, 39). Evanioidea are non-metallic in colour and have wing lengths in Nearctic species ranging from 2.3 mm in one species of Evaniidae (Townes 1949b) to over 13 mm in some Aulacidae (Townes 1950). Evanioidea possess the synapomorphy of having the metasoma attached high on the propodeum (Goulet and Huber 1993; Li et al. 2018). In terms of biology, Aulacidae are parasitoids of wood-boring insects, although hosts are not certain for many species. Some species of *Aulacus* Jurine (e.g., Fig. 34) are associated with species of *Xiphydria* Latreille (Hymenoptera: Xiphydriidae), for example, *A. burquei* (Provancher) has been reared from branches infested with *X. maculata* Say (Smith 1996a). Species of *Pristaulacus* Kieffer (Fig. 35) are also associated with *Xiphydria*, but also beetles (Coleoptera), for example, *Pristaulacus californicus* (Townes) has been reared from logs infested with *Paratimia conicola* Fisher (Cerambycidae) and *Chrysophana placida* (Leconte) (Buprestidae) (Townes 1950). Evaniidae lay their eggs in the oothecae of cockroaches (Dictyoptera: Blattaria) (Deans 2005; Deans et al. 2023) and the larvae generally consume more than one egg during development which makes them predators, not parasitoids. Similar to Aulacidae, it is difficult to be certain of the precise hosts of most species of Gasteruptiidae (Figs 38, 39), but they have been reared from nests of

solitary bees (Zhao et al. 2012) and it is assumed that they are predators of these bees, and perhaps also of solitary wasps. The larval gasteruptiid preys on one or more eggs or larvae to complete development (Mason 1993).

The phylogenomic study of Peters et al. (2017) recovered Evanioidea as the sister group of Stephanoidea with these two superfamilies placed as the sister group to Trigonalyoidea + Aculeata. Blaimer et al. (2023) also recovered the sister group relationship with Stephanoidea which along with Ceraphronoidea was sister group to (Trigonalyoidea + Megalyroidea) + Aculeata. Keys to the Nearctic species of Aulacidae are available (Townes 1950) and a more recent key to eastern species was provided by Smith (1996a) with updated valid names and combinations, for example *Aulacostethus* Phillipi of Townes (1950) = *Pristaulacus* Kieffer. A key to the Nearctic species of Gasteruptiidae is available (Townes 1950) and Smith (1996b) presented a more recent key to the eastern species with valid names, e.g., all species of *Rhydinofoenus* Bradley in Townes (1950) are now placed in *Gasteruption* Latreille. A key to world genera of Evaniidae is available (Deans and Huben 2003) and a key to Nearctic species has been published (Townes 1949b). Carlson (1979b) provided the Nearctic catalogue for Evanioidea, Deans (2005) updated the world catalogue for Evaniidae, and Smith (2001) published a world catalogue of Aulacidae. An online catalogue for Evanioidea including lists of all world species of Aulacidae and Evaniidae (Gasteruptiidae to be completed in the future) and an extensive list of references is available at Evanioidea Online (Deans et al. 2023).

Stephanoidea

Stephanoidea (Figs 40, 41) is a small, widespread superfamily of Hymenoptera comprised of one extant family: Stephanidae (Mason 1993). There are more than 360 described species worldwide (Aguiar 2004; Ceccolini 2021). Specimens are rarely collected with 95% of species being described from singletons (Aguiar 2004). They are long, slender insects with body length up to 3.5 cm (Hong et al. 2011) and are idiobiont ectoparasitoids of wood-boring insect larvae (Mason 1993). Most substantiated rearings are from Cerambycidae (Coleoptera) (Visitpanich 1994) and Buprestidae (Coleoptera) (Townes 1949a), but other families of beetles can also serve as hosts, as well as Siricidae (Hymenoptera) (Kirk 1975). See above (Evanioidea) for hypotheses of their placement in Hymenoptera. Most species of stephanids occur in tropical and subtropical forests (Hong et al. 2011), but species are also known from cooler regions as well as drier habitats such as deserts (Benoit 1984). Keys to genera are provided by van Achterberg (2002) (for the Old World, but including all genera) and Li et al. (2017) (including fossils). A key to the Nearctic species is provided by Aguiar and Johnson (2003). Aguiar (2004) published a world catalog including species distributions by country.

Trigonalyoidea

Trigonalyoidea (Figs 42, 43) includes one extant family (Trigonalyidae). The correct spelling of the family group name is controversial (Trigonalidae, Trigonalyidae or Trigonalydidae). For now, we follow Engel and Lelej (2020), although a future decision

from the International Commission on Zoological Nomenclature may be needed to establish one universally accepted family group name. The family is cosmopolitan with the exception of very high latitudes and alpine regions, but most species occur in tropical regions (Carmean and Kimsey 1998). Trigonalyids are not generally commonly collected (but see Smith 1996c) and are sometimes mistaken for Aculeata or Ichneumonidae because of similar wing venation and because most species have aposematic black and yellow body colour like many aculeates, whereas some have white-banded antennae like some ichneumonids (Chen et al. 2014). Trigonalyidae females lay eggs directly on leaves or detritus which may be eaten by caterpillars (Lepidoptera) (e.g., Clausen 1931), sawfly larvae (Hymenoptera) (e.g., Li et al. 2012) or crane fly larvae (Diptera: Tipulidae) (e.g., Gelhaus 1987). Because of the low chance of an egg being consumed, fecundity of female trigonalyids is very high, with females being observed to lay thousands of eggs, for example, Clausen (1929) reported a female of *Taeniogonalos* (= *Poecilogonalos*) *thwaitesii* (Westwood) lay 10,641 eggs in 14 days. Once ingested, the eggs hatch and the larvae bore through the intestinal wall of the host in search of an endoparasitoid larva such as an ichneumonid wasp as used by *P. thwaitesii* (Clausen 1929) or a tachinid fly as used by *Orthogonalys pulchella* (Cresson) (Carlson 1979c) (Fig. 42). If the host is not parasitized, then it is thought that trigonalyid larvae do not continue development (Smith 1996c). If it is parasitized, then the trigonalyid larva is presumed to be either ingested by the parasitoid larva or the trigonalyid larva directly penetrates the parasitoid larva (Weinstein and Austin 1991). The exceptions to this situation are for species of several genera including *Bareogonalos* Schulz and *Nomadina* Westwood that are known to develop in the nests of Vespinae and Polistinae (Vespidae), respectively, following provisioning of the vespid larval cells with caterpillar or sawfly larvae parasitized by trigonalyid larvae (Carmean 1991; Carmean and Kimsey 1998). In addition, some specimens of *Lycogaster pullata* Shuckard have been known to develop in a similar way in the nests of Eumeninae (Vespidae) (Cooper 1954), although this species also develops via ichneumonid-parasitized caterpillars (Bischoff 1909). Finally, eggs of two species of Australasian *Taeniogonalos* that are ingested by larvae of *Perga* spp. (Hymenoptera: Pergidae) are known to be able to develop as primary parasitoids in these hosts (Raff 1934) but can also develop as facultative hyperparasitoids (Weinstein and Austin 1995).

Phylogenetically, Carmean and Kimsey (1998) performed a morphology-based analysis of the internal relationships of Trigonalyidae, recognizing two subfamilies, although some later authors, for example, Chen et al. (2014), do not recognize these subfamilies. Trigonalyoidea are generally recovered as the sister group to Aculeata (Peters et al. 2017) or as the sister group of Megalyroidea which together form the sister group to Aculeata (Blaimer et al. 2023). Peters et al. (2017) did not include a representative of Megalyroidea in their study. Worldwide, there are about 120 described species of Trigonalyidae (Chen et al. 2020). A key to the Nearctic species is provided by Townes (1956), although one species (from the southeastern USA) has been described since then (Smith and Stocks 2005). Weinstein and Austin (1991) published a species catalogue for Trigonalyidae and an updated list of described species was provided by Carmean and Kimsey (1998). An online resource to the family is maintained by Carmean (2023).

Methods

Sources of data

The starting point of this study was based on examination of specimens deposited in the Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, ON, Canada (A. Bennett) (**CNC**). Other examined specimens are deposited in the following collections (with current curators and acronyms used in Table 2): American Museum of Natural History, New York, NY, USA (J. Carpenter) (**AMNH**); Centre for Biodiversity Genomics, University of Guelph, Guelph, Ontario, Canada (J. deWaard) (**BIOUG**); California Academy of Sciences, San Francisco, CA, USA (B. Zuparko) (**CAS**); Lyman Entomological Museum, McGill University, Montréal, QC, Canada (S. Boucher) (**LEMQ**); North Carolina State University, Raleigh, NC, USA (M. Bertone) (**NCSU**); Natural History Museum, London, United Kingdom (G. Broad) (**NHMUK**); Plant Health Diagnostic National Reference Laboratory, National Food Chain Safety Office, Budapest, Hungary (G. Melika) (**PHDNRL**); Royal Alberta Museum, Edmonton, AB, Canada (M. Buck) (**PMAE**); Frost Entomological Museum, University Park, PA, USA (A. Deans) (**PSUC**); Royal Ontario Museum, Toronto, ON, Canada (D.C. Darling) (**ROM**); Royal Saskatchewan Museum, Regina, SK, Canada (C. Sheffield) (**RSKM**); Texas A&M University, College Station, TX, USA (J. Oswald) (**TAMU**); University of Alaska Museum, Fairbanks, AK, USA (D. Sikes) (**UAM**); Provancher Collection, University of Laval, Laval, QC, Canada (C. Cloutier) (**ULQC**); United States National Museum, Washington, DC, USA (M. Buffington) (**USNM**). Some records are based on literature sources for which specimens could not be examined (literature citations shown in Table 2). In addition, several records were included based on verified photos from iNaturalist (**iNat**) or BugGuide (**BugG**) taken by individuals noted in the acknowledgements. We only include described species, not undescribed taxa or specimens identified only to genus. Fossils are not included in the checklist. All records published or in press up to October 1, 2024 were evaluated for the current checklist.

Presentation of data

Distributional data are presented as follows: Table 1 is a summary of the numbers of described, recorded species of the treated five superfamilies in Canada, Alaska and Greenland totalled for each family for all distributional regions of northern (mostly north of 45° latitude) North America. Table 2 is the species checklist arranged alphabetically by superfamily for these same regions. Species recorded in the literature but of uncertain taxonomy are included in Table 3 and these species are not included in the totals in Table 1. Distributions are indicated in these tables using acronyms of 17, mostly political regions. For practical purposes the province of Newfoundland and Labrador is divided into the island of Newfoundland and the region of Labrador on mainland Canada. The acronyms used for the regions are: **AK** = Alaska (USA), **GL** = Greenland, **CAN** = Canada and, within Canada, **AB** = Alberta, **BC** = British

Columbia, **LB** = Labrador, **MB** = Manitoba, **NB** = New Brunswick, **NF** = the island of Newfoundland, **NS** = Nova Scotia, **NT** = Northwest Territories, **NU** = Nunavut, **ON** = Ontario, **PE** = Prince Edward Island, **QC** = Quebec, **SK** = Saskatchewan, **YT** = Yukon territory. These regions are shown in Figs 1–3. In addition to the regions included in Tables 1–3, Figs 1–3 also show the French Overseas Collectivity of Saint Pierre and Miquelon Islands (SPM) located 25 km from the southern coast of Newfoundland. In the tables, the absence of a provincial or territorial acronym for a species recorded from Canada indicates that the taxon was recorded from Canada but no province was specified. The regions listed in Tables 1–3 are approximately from West to East beginning with northernmost continental North America (AK to NU) and then across more southern Canada (BC to NF), to Greenland, which provides a pictorial representation of the species' overall west-to-east distribution across northern North America. It contains three types of distributional records: 1) a published record for which we have examined a specimen; 2) a new (unpublished) record for which we have examined a specimen; and 3) a published record for which we have not examined a specimen, but trust its veracity. The different types of records are indicated by different colours and fonts in Tables 2, 3 (see Table headings).

Literature references (shown in the far-right column of Tables 2, 3) are only noted for previously published records for which no specimens were examined. Relevent major references for higher taxa (e.g., revisions of genera, regional checklists) are cited directly under the higher taxon names in Table 2. Our list is not a catalogue, therefore other than for recently changed or commonly misapplied names, synonyms and previous combinations are generally not included. These can be found in the catalogues and online sources cited in the respective sections of the Introduction. In addition, references for all of the original descriptions are not included; however, all genus and species names in Table 2 are listed with author and year of publication to facilitate reference to the original descriptions, if required. Formal taxonomic changes are noted in Table 2 and summarized in the abstract.

Classification

Classification for Ceraphronoidea follows the catalogue of Johnson and Musetti (2004). For Cynipoidea, the checklist mostly follows the family and subfamily classification of Buffington et al. (2020) with the changes proposed by Hearn et al. (2024) (i.e., recognition of Diplolepididae and Paraulacidae) as well as changes to the generic and species-level classification of Cynipidae proposed since 2020 (i.e., Russo 2021; Cuesta-Porta et al. 2022, 2023; Nicholls et al. 2022). Family and subfamily classification for Evanioidea follows Li et al. (2018) and generic and species classification follows Deans et al. (2023). Higher level classification of Stephanidae follows Li et al. (2017) whereas generic and species level classification follows Aguiar (2004). Higher level classification of Trigonalyoidea follows Carmean and Kimsey (1998) with the spellings of family group names following Lelej (2003), namely Trigonalyidae, Orthogonalyinae and Trigonalyinae.

Results and discussion

This checklist records a total of 296 extant, described species of Hymenoptera in northern North America in 79 genera in 12 families and 5 superfamilies (Tables 1, 2 and Figs 1–3). Within Canada, the inventory records 281 species in the same 79 genera, 12 families and 5 superfamilies, Alaska has 31 species in 16 genera in 6 families and Greenland has 7 species in 5 genera in 2 families. There are no species of any of the treated five superfamilies of Hymenoptera recorded from the French Overseas Collectivity of St. Pierre and Miquelon islands located 25 km from the southern coast of Newfoundland based on the list from the TAXREF database (Gargominy et al. 2021). In terms of new Canadian records of genera, there are 8 reported (1 Ceraphronoidea, 6 Cynipoidea and 1 Evanioidea) (Table 2), as well as 43 new species records from Canada (13 Ceraphronoidea, 28 Cynipoidea and 2 Evanioidea) (Table 1). Table 3 lists 23 additional species of uncertain taxonomy that have previously been recorded from northern North America in the literature but are excluded from the checklist until their status can be evaluated further. Finally, the family Figitidae is so poorly known in northern North America that we felt it necessary to comment on the overall knowledge of the subfamilies and genera in this family. This summary is at the end of the Figitidae section of the Results and Discussion and includes relative estimated species richness, generic

Table 1. Described, recorded species of Ceraphronoidea, Cynipoidea, Evanioidea, Stephanoidea and Trigonalyoidea in Canada, Alaska and Greenland totalled for each taxon and in each region. See Methods (Presentation of data) for description of distributional acronyms and Figs 1–3 for maps of their locations.

TAXON	CAN + AK + GL	CAN (New)	AK	YT	NT	NU	BC	AB	SK	MB	ON	QC	NB	PE	NS	LB	NF	GL
CERAPHRONOIDEA	**55**	**49(13)**	**6**	**0**	**0**	**0**	**15**	**3**	**3**	**6**	**28**	**17**	**1**	**0**	**2**	**0**	**0**	**2**
Ceraphronidae	24	24(7)	0	0	0	0	9	0	1	0	10	9	0	0	1	0	0	0
Megaspilidae	31	25(6)	6	0	0	0	6	3	2	6	18	8	1	0	1	0	0	2
CYNIPOIDEA	**205**	**196(28)**	**22**	**18**	**4**	**0**	**79**	**59**	**26**	**36**	**119**	**49**	**26**	**5**	**15**	**1**	**8**	**5**
Cynipidae	89	89(12)	1	1	0	0	24	13	5	19	57	17	4	1	4	0	3	0
Diplolepididae	24	24(3)	2	3	0	0	13	13	13	8	18	8	3	3	2	1	2	0
Figitidae	87	78(13)	19	14	3	0	40	32	8	8	41	21	16	1	6	0	3	5
Ibaliidae	4	4(0)	0	0	1	0	2	1	0	1	2	3	3	0	3	0	0	0
Liopteridae	1	1(0)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
EVANIOIDEA	**30**	**30(2)**	**3**	**1**	**3**	**0**	**15**	**6**	**3**	**7**	**21**	**16**	**7**	**4**	**9**	**0**	**1**	**0**
Aulacidae	18	18(0)	1	1	2	0	9	3	1	5	12	10	4	2	6	0	0	0
Evaniidae	4	4(2)	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0
Gasteruptiidae	8	8(0)	2	0	1	0	6	3	2	2	5	5	3	2	3	0	1	0
STEPHANOIDEA	**2**	**2(0)**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Stephanidae	2	2(0)	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0
TRIGONALYOIDEA	**4**	**4(0)**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**0**	**3**	**2**	**1**	**0**	**1**	**0**	**0**	**0**
Trigonalyidae	4	4(0)	0	0	0	0	1	1	1	0	3	2	1	0	1	0	0	0
CHECKLIST TOTAL	**296**	**281(43)**	**31**	**18**	**7**	**0**	**111**	**69**	**33**	**49**	**173**	**85**	**35**	**9**	**28**	**1**	**9**	**7**

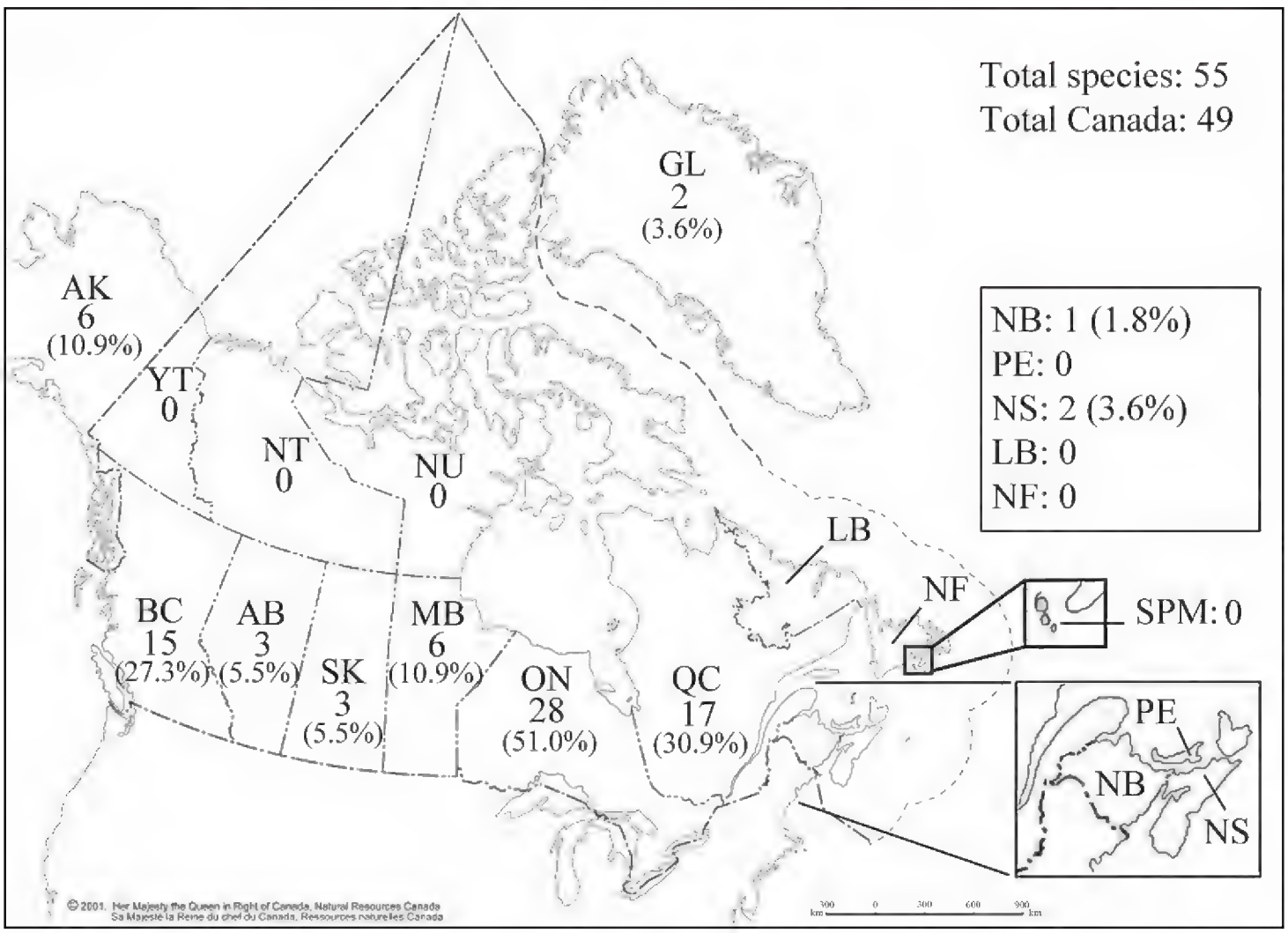

Figure 1. Map of Canada, Alaska and Greenland showing number of described, recorded Ceraphronoidea species and percentage of total species by region. Canada is comprised of all regions except for Alaska (AK), Greenland (GL) and St. Pierre and Miquelon (SPM). See Methods, Presentation of data section for all acronyms of regions treated in the checklist.

revisions (or the lack thereof), biology and overall distributions of taxa including genera that may not appear in Table 2 because, for example, they do not have reliable records of described species in northern North America.

Ceraphronoidea

There are 55 described species of Ceraphronoidea recorded in Canada, Alaska and Greenland in 10 genera in 2 families: Ceraphronidae (24 species) and Megaspilidae (31 species) (Table 1, Fig. 1). Within Canada, there are 49 species of Ceraphronoidea recorded in 10 genera (24 species of Ceraphronidae and 25 species of Megaspilidae). Alaska has six species of Ceraphronoidea (all Megaspilidae) recorded: *Lagynodes peckorum* Dessart, four species of *Conostigmus* and *Dendrocerus alaskensis* (Ashmead). Greenland has two species, both in *Dendrocerus* as reported in Buhl (2015). In addition to the 55 species in Table 2, the revision of *Conostigmus* by Trietsch et al. (2020) provided discussion about 4 species of uncertain status which were treated as *species inquirenda* (Table 3).

Table 2. Checklist of described species of Ceraphronoidea, Cynipoidea, Evanioidea, Stephanoidea and Trigonalyoidea of Canada, Alaska and Greenland. See Methods for description of acronyms of regions and Figs 1–3 for their locations. Black, regular font records are previously published and a specimen or diagnostic photograph has been examined. Red, boldfaced records are new (unpublished) records and a specimen or diagnostic photograph has been examined. All specimens examined are deposited in the CNC, except if a depository acronym is noted in the far right column. Blue, italicized records are previously published but no specimen has been examined. Literature references are only noted for "blue" records, except for *Conostigmus* (Megaspilidae) (see notes in row for genus). For species with multiple "blue" records based on multiple references, the references are listed in order from left to right, corresponding with the distributional records depicted from left to right, unless otherwise noted. An asterisk (*) denotes a record for which it is uncertain whether the record is from Labrador or the island of Newfoundland.

ORDER HYMENOPTERA																		
SUPERFAMILY CERAPHRONOIDEA																		
FAMILY CERAPHRONIDAE																		
Nearctic catalogue – Muesebeck 1979; world catalogue – Johnson and Musetti 2004; keys to genera – Dessart and Cancemi 1987.																		
Genus *Aphanogmus* Thomson, 1858																		
A. abdominalis (Thompson, 1858)	**CAN**	–	–	–	–	–	–	–	–	–	**QC**	–	–	–	–	–	–	
A. bicolor Ashmead, 1893	CAN	–	–	–	–	–	–	–	–	*ON*	**QC**	–	–	–	–	–	–	Ashmead 1893
A. canadensis Whittaker, 1930	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Whittaker 1930b
A. dorsalis Whittaker, 1930	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Whittaker 1930b
A. fulmeki Szelényi, 1940	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Gilkeson et al. 1993
A. fumipennis (Whittaker, 1930) (species complex)	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Whittaker 1930a
A. harringtoni Muesebeck, 1979	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
A. marylandicus Ashmead, 1893	**CAN**	–	–	–	–	–	–	–	–	–	**QC**	–	–	**NS**	–	–	–	
A. microneurus Kieffer, 1907	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Whittaker 1930b
A. subapterus Whittaker, 1930	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Whittaker 1930b
Genus *Ceraphron* Jurine, 1807																		
C. amplus Ashmead, 1893	**CAN**	–	–	–	–	–	–	–	–	–	**QC**	–	–	–	–	–	–	
C. auripes Ashmead, 1893	CAN	–	–	–	–	–	–	–	–	*ON*	**QC**	–	–	–	–	–	–	Ashmead 1893
C. barbieri Dessart, 1975	**CAN**	–	–	–	–	–	–	–	–	**ON**	**QC**	–	–	–	–	–	–	
C. bispinosus (Nees von Esenbeck, 1834)	CAN	–	–	–	–	–	–	**SK**	–	ON	**QC**	–	–	–	–	–	–	
C. concinnus (Whittaker, 1930)	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Whittaker 1930a
C. flaviscapus Ashmead, 1893	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
C. macroneurus Ashmead, 1887	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
C. melanocerus Ashmead, 1893	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Ashmead 1893
C. melantatocephalus Dessart, 1967	CAN	–	–	–	–	–	–	–	–	–	QC	–	–	–	–	–	–	
C. minutus (Ashmead, 1888)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Ashmead 1888
C. pacificus Whittaker, 1930	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Whittaker 1930b
C. pedalis Ashmead, 1893	**CAN**	–	–	–	–	–	–	–	–	–	**QC**	–	–	–	–	–	–	
C. whittakeri (Fouts, 1927)	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Fouts 1927
Genus *Pteroceraphron* Dessart, 1981																		
P. mirabilipennis Dessart, 1981	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
FAMILY MEGASPILIDAE																		
SUBFAMILY LAGYNODINAE																		
Key to genera – Dessart 1987.																		
Genus *Lagynodes* Förster, 1840																		
Key to species – Dessart 1987.																		
L. acuticornis (Kieffer, 1906)	**CAN**	–	–	–	–	–	–	–	–	**ON**	**QC**	–	–	–	–	–	–	
L. pallidus (Boheman, 1832)	**CAN**	–	–	–	–	–	**AB**	–	–	–	**QC**	–	–	–	–	–	–	
L. peckorum Dessart, 1987	–	AK	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
L. xanthus Whittaker, 1930	CAN	–	–	–	–	*BC*	–	–	**MB**	**ON**	–	–	–	–	–	–	–	Whittaker 1930a
SUBFAMILY MEGASPILINAE																		
Genus *Conostigmus* Dahlbom, 1858																		
Nearctic revision – Trietsch et al. 2020. Note: Trietsch et al. 2020 did not generally list provinces for Canadian records, therefore depositories of specimens are listed that support all records in this revision.																		
C. abdominalis (Boheman, 1832)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	CNC

C. bipunctatus Kieffer, 1907	CAN	AK	–	–	–	BC	–	–	MB	ON	–	–	–	–	–	–	–	AK,BC-AMNH, MB-PSUC, ON-ROM
C. dessarti Trietsch & Mikó, 2020	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	TAMU
C. dimidiatus (Thomson, 1858)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	AMNH
C. franzinii Trietsch & Mikó, 2020	–	AK	–	–	–	–	–	–	MB	–	–	–	–	–	–	–	–	PSUC
C. johnsoni Trietsch & Mikó, 2020	CAN	–	–	–	–	–	–	–	MB	–	–	–	–	–	–	–	–	PSUC
C. laeviceps (Ashmead, 1893)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	ROM
C. nigrorufus Dessart, 1997	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	CNC
C. obscurus (Thomson, 1858)	–	AK	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	UAM
C. pulchellus Whittaker, 1930	CAN	AK	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	PSUC, NHMUK
Genus *Creator* Alekseev, 1980																		
Generic status uncertain.																		
C. spissicornis (Hellén, 1966)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
Genus *Dendrocerus* Ratzeburg, 1852																		
D. arietinus (Provancher, 1887) Moved from *Conostigmus* by Trietsch et al. 2020. Maybe syn. with *D. penmaricus* (Ashmead)	CAN	–	–	–	–	–	–	–	–	–	QC	–	–	–	–	–	–	
D. alaskensis (Ashmead, 1902)	–	*AK*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Ashmead 1902
D. aphidum (Rondani, 1877)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	*GL*	Buhl 2015
D. bifoveatus (Kieffer, 1907)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	*GL*	Buhl 1995
D. carpenteri (Curtis, 1829)	CAN	–	–	–	–	–	AB	–	MB	ON	–	NB	–	–	–	–	–	
D. conwentziae Gahan, 1919	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	Marshall 2023
D. laticeps (Hedicke, 1929)	CAN	–	–	–	–	–	–	SK	MB	ON	–	–	–	–	–	–	–	SK,ON-BIOUG
D. leucopidis (Muesebeck, 1959)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
D. pallipes (Harrington, 1899)	CAN	–	–	–	–	–	–	–	–	–	QC	–	–	–	–	–	–	
D. penmaricus (Ashmead, 1893)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Ashmead 1893
D. picipes (Ashmead, 1893)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Ashmead 1893
D. stigmatus (Say, 1836)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Ashmead 1893
Genus *Megaspilus* Westwood, 1829																		
Nearctic species descriptions – Dessart 1981.																		
M. armatus (Say, 1836)	*CAN*	–	–	–	–	–	–	–	–	*ON*	*QC*	–	–	–	–	–	–	Muesebeck 1979
Genus *Platyceraphron* Kieffer, 1906																		
P. artideterens Dessart, 1981	CAN	–	–	–	–	–	–	–	–	ON	**QC**	–	–	–	–	–	–	
P. sulcatocarinatus Dessart, 1981	CAN	–	–	–	–	–	–	–	–	**ON**	QC	–	–	–	–	–	–	
Genus *Trichosteresis* Förster, 1856																		
T. glabra (Boheman, 1832)	CAN	–	–	–	–	BC	AB	**SK**	–	**ON**	**QC**	–	–	**NS**	–	–	–	
SUPERFAMILY CYNIPOIDEA																		
FAMILY CYNIPIDAE																		
Nearctic catalogue – Burks 1979; review of world genera of oak gall wasps – Melika and Abrahamson 2002; key to subfamilies and tribes – Buffington et al. 2020; Nearctic catalogue of rose and herb gall wasps and their inquilines – Nastasi and Deans 2021; keys to Nearctic genera of herb, rose, bramble and inquiline gall wasps – Nastasi et al. 2024b.																		
Genus *Acraspis* Mayr, 1881																		
A. erinacei (Beutenmüller, 1909)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
A. pezomachoides (Osten Sacken, 1862)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
A. quercushirta (Bassett, 1864) = *A. macrocarpae* Bassett, 1890	CAN	–	–	–	–	–	AB	*SK*	MB	ON	*QC*	*NB*	–	–	–	–	–	Nicholls et al. 2022
A. villosa Gillette, 1888	CAN	–	–	–	–	–	AB	–	*MB*	**ON**	–	–	–	–	–	–	–	MB-Nicholls et al. 2022
Genus *Amphibolips* Reinhard, 1865																		
A. confluentus (Harris, 1841)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
A. cookii Gillette, 1888	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
A. quercusinanis (Osten-Sacken, 1861)	CAN	–	–	–	–	–	–	–	–	ON	QC	–	–	–	–	–	–	
A. quercusostensackenii (Bassett, 1863) = *Andricus quercussingularis* (Bassett, 1863)	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Burks 1979
A. quercusspongifica (Osten Sacken, 1862)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
Genus *Andricus* Hartig, 1840																		
A. columbiensis Melika, Nicholls & Stone, 2021	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Melika et al. 2021
A. dimorphus (Beutenmüller, 1913)	**CAN**	–	–	–	–	–	–	–	**MB**	–	–	–	–	–	–	–	–	PHDNRL
A. favosus (Bassett, 1890)	**CAN**	–	–	–	–	–	–	–	–	–	**QC**	–	–	–	–	–	–	

A. foliaformis Gillette, 1888	**CAN**	–	–	–	–	–	–	–	**MB**	–	–	–	–	–	–	–	–	PHDNRL
A. occultatus (Weld, 1926)	**CAN**	–	–	–	–	**BC**	–	–	–	–	–	–	–	–	–	–	–	PHDNRL
A. opertus (Weld, 1926)	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Evans 1972
A. quercuscalifornicus (Bassett, 1881)	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Earley, in press.
A. quercuscornigera (Osten Sacken, 1862)	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
A. quercusfrondosa (Bassett, 1865)	**CAN**	–	–	–	–	–	–	–	**MB**	–	–	–	–	–	–	–	–	PHDNRL
A. quercusoperator (Osten-Sacken, 1862)	*CAN*	–	–	–	–	–	–	–	–	–	–	–	–	*NS*	–	–	–	Burks 1979
A. quercuspetiolicola (Bassett, 1863)	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
A. quercusstrobilanus (Osten Sacken, 1862)	*CAN*	–	–	–	–	–	–	–	**MB**	*ON*	–	–	–	–	–	–	–	PHDNRL, Burks 1979
A. schickae Nicholls, Melika & Stone, 2021	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Melika et al. 2021
A. verensis Weld, 1957	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Evans 1985
A. weldi (Beutenmüller, 1913)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
Genus *Antistrophus* Walsh, 1870																		
A. lygodesmiaepisum Walsh, 1870	CAN	–	–	–	–	–	AB	*SK*	–	–	–	–	–	–	–	–	–	Nastasi and Deans 2021
Genus *Atrusca* Kinsey, 1930																		
A. trimaculosa (McCracken & Egbert, 1922)	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Evans 1985
Genus *Aulacidea* Ashmead, 1897																		
Nearctic revision – Beutenmüller 1910; Nearctic distributions and nomenclature – Nastasi and Deans 2021.																		
A. abdita Kinsey, 1920	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Kinsey 1920
A. follioti Barbotin, 1972	*CAN*	–	–	–	–	*BC*	–	–	–	*ON*	–	–	–	–	–	–	–	Nastasi and Deans 2024
A. harringtoni (Ashmead, 1887)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Ashmead 1887
A. nabali (Brodie, 1892)	CAN	–	–	–	–	–	–	–	–	*ON*	QC	–	–	–	–	–	–	Beutenmüller 1910
A. podagrae (Bassett, 1890)	*CAN*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Beutenmüller 1910
A. subterminalis Niblett, 1946	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Nastasi and Deans 2021
A. tumida (Bassett, 1890)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
Genus *Aylax* Hartig, 1840																		
A. quinquecostatus (Provancher, 1883)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Provancher 1883
Genus *Bassettia* Ashmead, 1887																		
B. flavipes (Gillette, 1889)	*CAN*	–	–	–	–	–	*AB*	–	–	*ON*	–	–	–	–	–	–	–	Nicholls et al. 2022
B. lignii Kinsey, 1922	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Evans 1972
Genus *Besbicus* Kinsey, 1922																		
B. mirabilis (Kinsey, 1922)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
= *Cynips mirabilis* Kinsey, 1922																		
Genus *Callirhytis* Förster, 1869																		
C. clavula (Osten-Sacken, 1865)	**CAN**	–	–	–	–	–	–	–	–	–	–	–	–	**NS**	–	–	–	
C. quercusfutilis (Osten-Sacken, 1861)	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
C. quercuspunctata (Bassett, 1863)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
C. quercuspunctatus (Osten Sacken, 1862)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
C. seminator (Harris, 1841)	CAN	–	–	–	–	–	–	–	–	ON	*QC*	–	–	–	–	–	–	Burks 1979
Genus *Ceroptres* Hartig, 1840																		
World revision and species key – Lobato-Vila and Pujade-Villar 2019; key to Nearctic species and new species descriptions – Nastasi et al. 2024c																		
C. lokii Nastasi, Smith & Davis, 2024	*CAN*	–	–	–	–	–	–	–	*MB*	–	–	–	–	–	–	–	–	Nastasi et al. 2024c
C. petiolicola (Osten Sacken, 1861)	*CAN*	–	–	–	–	–	–	–	–	*ON*	*QC*	–	–	–	–	–	–	Provancher 1887; Nastasi and Deans 2021
C. tikoloshei Nastasi, Smith & Davis, 2024	*CAN*	–	–	–	–	–	–	–	*MB*	–	–	–	–	–	–	–	–	Nastasi et al. 2024c
Genus *Diastrophus* Hartig, 1840																		
Nearctic distributions and nomenclature – Nastasi and Deans 2021																		
D. cuscutaeformis Osten-Sacken, 1863	CAN	–	–	–	–	–	–	–	–	*ON*	**QC**	–	–	–	–	*NF**	–	ON-Burks 1979; NF-Nastasi and Deans 2021
D. fragariae Beutenmüller, 1915	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Nastasi and Deans 2021

D. fusiformans Ashmead, 1890	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
D. kincaidii Gillette, 1893	CAN	–	–	–	–	BC	–	–	–	*ON*	–	–	–	–	–	–	–	Nastasi and Deans 2021
D. nebulosus (Osten Sacken, 1861)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
D. piceus Provancher, 1887	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
D. potentillae Bassett, 1864	CAN	–	–	–	–	–	–	–	–	**ON**	–	*NB*	–	*NS*	–	–	–	Nastasi and Deans 2021
D. radicum Bassett, 1870	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
D. tumefactus Kinsey, 1920	*CAN*	–	–	–	–	–	–	–	–	*ON*	*QC*	–	–	–	–	–	–	Kinsey 1920
D. turgidus Bassett, 1870	*CAN*	–	–	–	–	–	–	–	*MB*	*ON*	*QC*	–	–	–	–	*NF**	–	Nastasi and Deans 2021
Genus *Disholcaspis* Dalla Torre & Keiffer, 1881																		
D. eldoradensis (Beutenmüller, 1909)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
D. mellifica Weld, 1957	**CAN**	–	–	–	–	**BC**	–	–	–	–	–	–	–	–	–	–	–	PHDNRL
D. quercusmamma (Walsh & Riley, 1869)	CAN	–	–	–	**AB**	–	–	–	MB	**ON**	–	–	–	–	–	–	–	AB-PHDNRL
D. simulata Kinsey, 1922	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
Genus *Druon* Kinsey, 1937																		
Revision and key – Cuesta-Porta et al. 2022																		
D. ignotum (Bassett, 1881)	CAN	–	–	–	–	–	AB	**SK**	MB	**ON**	**QC**	–	–	–	–	–	–	SK,ON,QC-iNat
Genus *Dryocosmus* Giraud, 1859																		
D. kuriphilus Yasumatsu, 1951	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
D. quercuspalustris (Osten-Sacken, 1861)	CAN	–	–	–	–	–	–	–	–	*ON*	QC	–	–	–	–	–	–	Burks 1979
Genus *Feron* Kinsey, 1937																		
Revision and key – Cuesta-Porta et al. 2023.																		
F. rucklei Melika, Nicholls & Stone, 2023	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Cuesta-Porta et al. 2023
Genus *Kokkocynips* Pujade-Villar & Melika, 2013																		
K. imbricariae (Ashmead, 1896) = *Dryocosmus imbricariae* (Ashmead, 1896)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Nieves-Aldrey et al. 2021
Genus *Liposthenes* Förster, 1869																		
L. glechomae (Linnaeus, 1758)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
Genus *Neaylax* Nieves-Aldrey, 1994																		
N. verbenacus (Nieves-Aldrey, 1988)	*CAN*	–	–	–	–	–	–	–	*MB*	–	–	–	–	–	–	–	–	Nastasi et al. 2024a
Genus *Neuroterus* Hartig, 1840																		
N. floccosus (Bassett, 1881)	*CAN*	–	–	–	–	*BC*	*AB*	–	–	*ON*	–	–	–	–	–	–	–	Nicholls et al. 2022
N. minutus (Bassett, 1881)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
N. niger Gillette, 1888	*CAN*	–	–	–	–	–	*AB*	–	–	*ON*	–	–	–	–	–	–	–	Nicholls et al. 2022; Burks 1979
N. quercusirregularis (Osten Sacken, 1861) = *N. quercusmajalis* (Bassett, 1864)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
N. saltarius Weld, 1926	**CAN**	–	–	–	–	**BC**	–	–	–	**ON**	–	–	–	–	–	–	–	BC-PHDNRL
N. vesicula (Bassett, 1881)	CAN	–	–	–	–	–	–	–	MB	*ON*	–	–	–	–	–	–	–	Burks 1979
N. washingtonensis Beutenmüller, 1913	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
N. umbilicatus Bassett, 1900	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
Genus *Periclistus* Förster, 1869																		
P. piceus Fullaway, 1911	*CAN*	–	*YT*	–	–	*BC*	*AB*	–	–	*ON*	–	–	–	–	–	–	–	Zhang et al. 2019
P. pirata (Osten-Sacken, 1863)	CAN	–	–	–	–	–	AB	*SK*	–	ON	–	–	–	–	–	–	–	Zhang et al. 2019
Genus *Phanacis* Förster, 1860																		
Nearctic distributions and nomenclature – Nastasi and Deans 2021.																		
P. hypochoeridis (Kieffer, 1887)	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Nastasi and Deans 2021
P. taraxaci (Ashmead, 1897)	CAN	*AK*	–	–	–	*BC*	*AB*	SK	*MB*	*ON*	*QC*	–	–	–	–	**NF**	–	AK, BC, MB, QC-Earley 2024; AB-Paquette et al. 1993; ON-Burks 1979, NF-iNat

Genus *Philonix* Fitch, 1859																	
P. fulvicollis Fitch, 1859	*CAN*	–	–	–	–	–	*AB*	–	*MB*	*ON*	*QC*	*NB*	–	–	–	–	–	Nicholls et al. 2022
Genus *Phylloteras* Ashmead, 1897																	
P. poculum (Osten Sacken 1862)	*CAN*	–	–	–	–	–	*AB*	–	*MB*	–	–	–	–	–	–	–	–	Nicholls et al. 2022
Genus *Synergus* Hartig, 1840																	
Revision and key to species – Lobato-Vila and Pujade-Villar 2021; Nearctic distributions and nomenclature – Nastasi and Deans 2021.																	
S. dimorphus Osten-Sacken, 1865	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
S. erinacei Gillette, 1896	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Nastasi and Deans 2021
S. oneratus (Harris, 1841)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Nastasi and Deans 2021
S. pacificus McCracken & Egbert, 1922	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
Genus *Synophromorpha* Ashmead, 1903																	
Nearctic distributions and nomenclature – Nastasi and Deans 2021																	
S. rubi Weld, 1952	CAN	–	–	–	–	–	–	–	–	ON	**QC**	–	–	–	–	–	–	
S. sylvestris (Osten-Sacken, 1861)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
Genus *Xanthoteras* Ashmead, 1897																	
X. pulchellum (Beutenmüller, 1911)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
X. radicola (Ashmead, 1896)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
Genus *Zopheroteras* Ashmead, 1897																	
Z. guttatum Weld	*CAN*	–	–	–	–	–	–	–	–	*ON*	**QC**	**NB**	**PE**	**NS**	–	–	–	ON-Marshall 2023, QC,NB,PE,NS-iNat
FAMILY DIPLOLEPIDIDAE																	
Genus *Diplolepis* Geoffroy, 1785																	
Ecology – Shorthouse 2010; molecular species limits – Zhang et al. 2019; Nearctic distributions and nomenclature – Nastasi and Deans 2021.																	
D. bassetti (Beutenmüller, 1918)	CAN	–	–	–	–	BC	AB	*SK*	–	–	–	–	–	–	–	–	–	Shorthouse 2010
D. bicolor (Harris, 1852)	CAN	–	–	–	–	BC	AB	SK	*MB*	ON	*QC*	*NB*	–	*NS*	–	–	–	Nastasi and Deans 2021
D. dichlocera (Harris, 1852)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
D. eglantariae (Hartig, 1840)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Zhang et al. 2019
D. fulgens (Gillete, 1894)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
D. fusiformans (Ashmead, 1890)	CAN	–	–	–	–	BC	*AB*	*SK*	*MB*	ON	–	–	–	–	–	–	–	Shorthouse 2010
D. gracilis (Ashmead, 1896)	CAN	–	–	–	–	*BC*	AB	SK	*MB*	*ON*	–	–	–	–	–	–	–	BC-Nastasi and Deans 2019; MB-Friesen and Zhang 2021; ON-Burks 1979
D. ignota (Osten-Sacken, 1862)	CAN	–	–	–	–	–	AB	SK	*MB*	*ON*	**QC**	–	–	–	–	–	–	MB-Friesen and Zhang 2021; ON-Burks 1979
D. inconspicua Dailey & Campbell, 1973	**CAN**	–	–	–	–	–	**AB**	–	–	–	–	–	–	–	–	–	–	
D. mayri (Schlechtendal, 1877)	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
D. nebulosa (Bassett, 1890) May be j. syn. of *D. ignota* (Friesen & Zhang, 2021)	CAN	–	–	–	–	–	AB	SK	–	ON	–	–	–	–	–	–	–	
D. nervosa (Curtis, 1838)	*CAN*	–	–	–	–	–	–	–	–	*ON*	*QC*	–	–	–	–	–	–	Nastasi and Deans 2021
D. nodulosa (Beutenmüller, 1909)	CAN	–	–	–	–	BC	AB	SK	*MB*	ON	*QC*	*NB*	*PE*	–	–	–	–	Shorthouse 2010
D. oregonensis (Beutenmüller, 1918)	*CAN*	–	–	–	–	–	–	*SK*	–	–	–	–	–	–	–	–	–	Zhang et al. 2019
D. polita (Ashmead, 1890)	CAN	*AK*	YT	–	–	BC	AB	SK	*MB*	ON	*QC*	–	–	–	–	–	–	Shorthouse 2010
D. radicum (Osten-Sacken, 1862)	CAN	–	–	–	–	BC	*AB*	SK	*MB*	ON	**QC**	–	–	–	–	–	–	Shorthouse 2010
D. rosae (Linnaeus, 1758)	CAN	–	–	–	–	–	–	–	–	**ON**	QC	–	–	–	–	**NF**	–	
D. rosaefolii (Ashmead, 1890)	CAN	*AK*	*YT*	–	–	*BC*	AB	SK	*MB*	ON	QC	*NB*	PE	*NS*	*LB*	*NF*	–	Shorthouse 2010
D. spinosa (Ashmead, 1887)	CAN	–	–	–	–	BC	AB	SK	MB	ON	–	–	–	–	–	–	–	
D. triforma Shorthouse & Ritchie, 1984	CAN	–	*YT*	–	–	BC	AB	SK	*MB*	ON	–	–	–	–	–	–	–	Shorthouse 2010

D. tuberculator (Cockerell, 1888)	CAN	–	–	–	–	**BC**	–	–	*MB*	–	–	–	–	–	–	–	–	Friesen and Zhang 2021
D. tumida (Bassett, 1890)	**CAN**	–	–	–	–	**BC**	–	–	–	–	–	–	–	–	–	–	–	
D. variabilis (Bassett, 1890)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
D. verna (Osten Sacken, 1863)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	*PE*	–	–	–	–	Burks 1979
FAMILY FIGITIDAE																		
Nearctic catalogue – Burks 1979; key to genera of Greenland – Vilhelmsen and Forshage 2015; key to subfamilies and tribes – Buffington et al. 2020.																		
SUBFAMILY ANACHARITINAE																		
Key to genera – Restrepo-Ortiz and Pujade-Villar 2010.																		
Genus *Anacharis* Dalman, 1823																		
A. eucharioides (Dalman, 1818)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	*GL*	Vilhelmsen and Forshage 2015	
Genus *Hexacharis* Kieffer, 1907																		
Generic status and included species – Restrepo-Ortiz and Pujade-Villar 2010.																		
H. flavipes Kieffer, 1907	–	AK	–	–	–	–	–	–	–	–	–	–	–	–	–	–		
Genus *Xyalaspis* Hartig, 1843																		
New World revision – Mata-Casanova et al. 2014.																		
X. flavipes Ashmead, 1896	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Mata-Casanova et al. 2014
X. hirsuta Mata-Casanova, Selfa & Pujade-Villar, 2014	*CAN*	–	–	–	–	–	–	–	–	–	–	*NB*	–	–	–	–	–	Mata-Casanova et al. 2014
SUBFAMILY ASPICERINAE																		
Key to genera – Ros-Farré 2007.																		
Genus *Aspicera* Dahlbom, 1842																		
World revision – Ros-Farré and Pujade-Villar 2013.																		
A. carinata Ros-Farré & Pujade-Villar, 2013	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
A. carlestolrai Ros-Farré & Pujade-Villar, 2013	CAN	–	–	–	–	–	AB	–	–	–	–	–	–	–	–	–	–	
A. gemmae Ros-Farré & Pujade-Villar, 2013	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
A. jantonii Ros-Farré, 2013	CAN	–	–	–	–	–	AB	–	–	–	–	–	–	–	–	–	–	
A. marginata Ros-Farré & Pujade-Villar, 2013	–	AK	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
A. mireiae Ros-Farré & Pujade-Villar, 2013	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
A. santamariai Ros-Farré & Pujade-Villar, 2013	CAN	–	*YT*	–	–	*BC*	AB	–	–	–	–	–	–	–	–	–	–	Ratzlaff 2018
A. singularica Ros-Farré & Pujade-Villar, 2013	CAN	–	–	–	–	BC	AB	–	–	–	–	–	–	–	–	–	–	
A. teresae Ros-Farré, 2013	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
Genus *Callaspidia* Dahlbom, 1842																		
World revision – Ros-Farré and Pujade-Villar 2009a.																		
C. defonscolombei Dahlbom, 1842 = *C. provancheri* Ashmead, 1887	CAN	–	YT	NT	–	BC	AB	–	–	ON	QC	NB	–	NS	–	*NF*	–	Ros-Farré and Pujade-Villar 2009a
Genus *Omalaspis* Giraud, 1860																		
Holarctic revision – Ros-Farré and Pujade-Villar 2011a.																		
O. brandaoi Pujade-Villar & Ros-Farré, 2011	CAN	–	–	–	–	–	AB	–	–	ON	**QC**	–	–	–	–	–	–	
O. cavroi (Hedicke, 1914)	CAN	*AK*	*YT*	–	–	BC	AB	–	–	ON	QC	NB	–	–	–	–	–	Ros-Farré and Pujade-Villar 2011a; Ratzlaff 2018
O. curvilineata Ros-Farré & Pujade-Villar, 2011	CAN	–	–	–	–	–	–	–	–	–	–	NB	–	–	–	–	–	
Genus *Paraspicera* Kieffer, 1907																		
World revision – Ros-Farré and Pujade-Villar 2011b																		
P. bakeri Kieffer, 1907	CAN	–	–	–	–	–	–	–	–	ON	*QC*	NB	–	–	–	–	–	Ros-Farré and Pujade-Villar 2011b
P. brandaoi Ros-Farré & Pujade-Villar, 2011	CAN	–	*YT*	–	–	*BC*	AB	–	–	–	–	–	–	–	–	–	–	Ratzlaff 2018; Ros-Farré and Pujade-Villar 2011b

SUBFAMILY CHARIPINAE

Nearctic catalogue of "Alloxystidae" – Andrews 1978; key to Nearctic genera and species checklist – Menke and Evenhuis 1991; world catalogue with key to genera – Ferrer-Suay et al. 2012.

Genus *Alloxysta* Förster, 1869

Revision of Nearctic type specimens with re-description of species – Ferrer-Suay et al. 2013.

A. arcuata (Kieffer, 1902)	CAN	*AK*	–	–	–	*BC*	–	–	–	**ON**	–	–	–	–	–	–	*GL*	AK,BC-Ferrer-Suay et al. 2014; GL-Vilhelmsen and Forshage 2015
A. brevis (Thomson, 1862)	CAN	–	–	–	–	*BC*	–	–	–	ON	–	NB	–	–	–	–	–	Andrews 1978
A. castanea (Hartig, 1841) = *A. quebeci* Andrews, 1978	CAN	–	–	–	–	**BC**	–	–	–	**ON**	QC	–	–	–	–	–	–	
A. consobrina (Zetterstedt, 1838) = *A. fuscicornis* (Hartig, 1841)	**CAN**	–	–	–	–	**BC**	–	–	–	**ON**	–	**NB**	–	–	–	–	–	
A. filimentosus Andrews, 1978	**CAN**	–	–	–	–	**BC**	–	–	–	–	–	–	–	–	–	–	–	
A. fracticornis (Thomson, 1862)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Ferrer-Suay et al. 2014
A. fuscicornis (Hartig, 1841)	**CAN**	–	–	–	–	**BC**	–	–	–	**ON**	–	**NB**	–	–	–	–	–	
A. halterata (Thomson, 1862)	*CAN*	–	*YT*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Ratzlaff 2018
A. japonica (Ashmead, 1904)	–	AK	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
A. lachni (Ashmead, 1885)	CAN	–	–	–	–	BC	–	–	MB	*ON*	–	–	–	–	–	–	–	Andrews 1978
A. macrophadna (Hartig, 1841) = *A. alaskensis* Ashmead, 1902	CAN	AK	–	*NT*	–	BC	–	–	MB	ON	QC	–	PE	–	–	*NF*	–	Ferrer-Suay et al. 2014
A. minuscula Andrews, 1978	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
A. obscurata (Hartig, 1840) = *A. anthracina* Andrews, 1978	CAN	AK	*YT*	–	–	BC	*AB*	–	–	–	*QC*	–	–	–	–	–	–	Ratzlaff 2018; Andrews 1978; Ferrer-Suay et al. 2012
A. pallidicornis (Curtis, 1838)	CAN	AK	–	–	–	*BC*	AB	–	–	–	QC	**NB**	–	–	–	–	–	Ratzlaff 2018
A. pilipennis (Hartig, 1840)	*CAN*	*AK*	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Ferrer-Suay et al. 2014
A. postica (Hartig. 1841)	*CAN*	–	*YT*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Ratzlaff 2018
A. vandenboschi Andrews, 1978	CAN	*AK*	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	Ferrer-Suay et al. 2013
A. victrix (Westwood, 1833)	**CAN**	–	**YT**	–	–	**BC**	**AB**	–	**MB**	**ON**	**QC**	**NB**	–	–	–	–	*GL*	Vilhelmsen and Forshage 2015
A. xanthopsis (Ashmead, 1896)	*CAN*	*AK*	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Andrews 1978

Genus *Dilyta* Förster, 1869

Nearctic revision – Paretas-Martínez et al. 2011.

D. rathmanae Menke & Evenhuis, 1991	**CAN**	–	**YT**	–	–	–	**AB**	–	–	–	**QC**	–	–	–	–	–	–	
D. subclavata Förster, 1869	**CAN**	*AK*	**YT**	–	–	–	–	–	–	–	–	**NB**	–	–	–	–	–	Paretas-Martínez et al. 2011

Genus *Lytoxysta* Kieffer, 1909

Generic diagnosis – Menke and Evenhuis 1991.

L. brevipalpis Kieffer, 1909	CAN	AK	–	–	–	BC	**AB**	**SK**	*MB*	**ON**	–	–	–	–	–	–	–	Menke and Evenhuis 1991

Genus *Phaenoglyphis* Förster, 1869

World revision – Ferrer-Suay et al. 2019.

P. americana Baker, 1896	CAN	AK	–	–	–	BC	AB	–	MB	ON	QC	*NB*	–	**NS**	–	–	–	Menke and Evenhuis 1991
P. falcata Andrews, 1978	CAN	–	–	–	–	BC	AB	–	–	–	–	–	–	–	–	–	–	
P. gutierrezi Andrews, 1978	CAN	–	*YT*	–	–	BC	–	SK	–	–	–	–	–	–	–	–	–	Ratzlaff 2018
P. heterocera (Hartig, 1841) Listed as Palaearctic only by Ferrer-Suay et al. 2019	*CAN*	–	–	–	–	–	*AB*	–	–	–	–	–	–	–	–	–	–	Ferrer-Suay et al. 2014
P. laevis Andrews, 1978	CAN	–	–	–	–	BC	AB	–	–	–	–	–	–	–	–	–	–	
P. palmirae Pujade-Villar, 2018	–	*AK*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Ferrer-Suay et al. 2019
P. pilosus Andrews, 1978	CAN	–	*YT*	–	–	BC	AB	–	–	–	–	–	–	–	–	–	–	Ratzlaff 2018
P. ruficornis Förster, 1869	CAN	–	*YT*	–	–	*BC*	–	SK	–	ON	QC	–	–	–	–	–	–	Ratzlaff 2018; Menke and Evenhuis 1991
P. stenos Andrews, 1978	–	AK	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	

P. villosa (Hartig, 1841) = *P. ambrosiae* (Ashmead, 1898)	CAN	–	*YT*	NT	–	BC	*AB*	–	MB	ON	–	NB	–	NS	–	–	–	YT-Ratzlaff 2018; NT,AB-Menke and Evenhuis 1991

SUBFAMILY EUCOILINAE

Key to major Holarctic genera – Forshage and Nordlander 2008; revision of Zauecolilini – Buffington 2009; revision of Diglyphosematini – Buffington 2011; Nearctic catalogue – Forshage et al. 2013; key to world tribes and list of world genera – Buffington et al. 2020.

Genus *Banacuniculus* Buffington, 2010

Revision – Buffington 2010a.

B. hunteri (Crawford, 1913)	CAN	–	–	–	–	*BC*	AB	–	–	–	–	NB	–	NS	–	–	–	Buffington 2010a
B. merickeli (Miller, 1989)	CAN	–	–	–	–	–	AB	–	–	–	–	–	–	–	–	–	–	
B. nigrimanus (Kieffer, 1907)	CAN	–	–	–	–	–	AB	–	–	–	–	–	–	–	–	–	–	
B. utilis (Beardsley, 1988)	CAN	–	–	–	–	–	AB	–	–	–	–	–	–	–	–	–	–	

Genus *Cothonaspis* Hartig, 1840

C. pentatomus Hartig, 1840	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	

Genus *Eucoila* Westwood, 1833

E. hirticornis Kieffer, 1910	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	

Genus *Ganaspidium* Weld, 1955

Revision – Buffington 2010b.

G. kolmaci Buffington, 2010	CAN	–	–	–	–	BC	AB	SK	–	–	–	–	–	–	–	–	–	
G. konzaensis Buffington, 2010	CAN	–	–	–	–	–	AB	–	–	–	–	–	–	–	–	–	–	
G. pusillae Weld, 1955	CAN	–	–	–	–	–	AB	–	–	–	–	–	–	–	–	–	–	

Genus *Ganaspis* Förster, 1869

Revision of *G. brasiliensis* species complex – Sosa-Calvo et al. 2024.

G. kimorum Buffington, 2024	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	

Genus *Hexacola* Förster, 1869

Presence in Canada – Diamond et al. 2001.

H. neoscatellae Beardsley, 1990	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	

Genus *Kleidotoma* Westwood, 1833

K. psiloides Westwood, 1833	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	*GL*	Vilhelmsen and Forshage 2015

Genus *Leptopilina* Förster, 1869

Revision – Nordlander 1980; review including key to species of eastern USA – Lue et al. 2016; Nearctic distribution as parasitoids of *Drosophila suzukii* – Gariepy et al. 2024.

L.heterotoma (Thomson, 1862)	*CAN*	–	–	–	*BC*	–	–	–	–	*ON*	–	–	–	–	–	–	–	Gariepy et al. 2024
L. japonica Novkovic & Kimura, 2011	CAN	–	–	–	BC	–	–	–	–	ON	–	–	–	–	–	–	–	
L. leipsi Lue & Buffington, 2016	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Gariepy et al. 2024
L. maia Lue & Buffington, 2016	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Gariepy et al. 2024

Genus *Sinatra* Buffington, 2011

Description – Buffington 2011.

S. pacifica (Yoshimoto, 1962)	**CAN**	–	–	–	–	–	**AB**	–	–	–	–	–	–	–	–	–	–	

Genus *Striatovertex* Schick, Forshage & Nordlander, 2011

Generic description and included species – Schick et al. 2011.

S. erythropa (Ashmead, 1888)	**CAN**	–	–	–	–	–	–	**SK**	–	**ON**	–	**NB**	–	–	–	–	–	
S. impatiens (Say, 1836)	**CAN**	–	–	–	–	**BC**	**AB**	–	–	**ON**	**QC**	–	–	–	–	–	–	
S. rufocincta (Kieffer, 1907)	**CAN**	–	–	–	–	**BC**	**AB**	–	–	**ON**	**QC**	–	–	–	–	–	–	

Genus *Trybliographa* Förster, 1869

Review with generic diagnosis – Nordlander 1981.

T. clavatipalpis (Kieffer, 1907)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	CAS
T. cupilifera (Provancher, 1881)	CAN	–	–	–	–	–	–	–	–	–	QC	–	–	–	–	–	–	ULQC
T. diaphana (Hartig, 1841) = *T. nigricornis* (Provancher, 1888)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	ULQC
T. rapae (Westwood, 1835)	CAN	**AK**	–	–	–	BC	**AB**	**SK**	**MB**	ON	**QC**	**NB**	–	**NS**	–	**NF**	–	AK,QC,NB,NS-Forshage, unpublished
T. simulatrix (Ruthe, 1859) = *Eucoela alaskensis* Ashmead, 1902	–	AK	–	–	–	–	–	–	–	–	–	–	–	–	–	–	GL	
T. stigmata (Say, 1836) = *T. maculipennis* (Provancher, 1881)	CAN	–	–	–	–	–	–	–	–	–	QC	–	–	–	–	–	–	ULQC

Genus *Zaeucoila* Ashmead, 1903

World revision and senior status relative to *Agrostocynips* Díaz – Buffington et al. 2017.

Z. robusta (Ashmead, 1894)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	

SUBFAMILY FIGITINAE																		
Key to genera with scutellar spine – Jiménez et al. 2008b.																		
Genus *Amphithectus* Hartig, 1840																		
Review with generic diagnosis – Forshage and Nordlander 2018.																		
A. slossonae (Crawford, 1918), comb. nov. = *Melanips slossonae* (Crawford, 1918)	CAN	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–		
Genus *Neralsia* Cameron, 1883																		
Nearctic revision – Jiménez et al. 2008a.																		
N. ashmeadi Jiménez and Pujade-Villar, 2008	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
N. hyalinipennis (Ashmead, 1887)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
N. incompleta Jiménez and Pujade-Villar, 2006	CAN	–	–	–	–	BC	–	–	–	ON	QC	–	–	–	–	–	–	
N. readae Jiménez and Pujade-Villar, 2008	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
N. weldi Jiménez and Pujade-Villar, 2008	CAN	–	–	–	–	–	–	–	–	ON	QC	–	–	–	–	–	–	
Genus *Xyalophora* Kieffer, 1901																		
World revision – Jiménez et al. 2008b																		
X. clavata (Giraud, 1860)	*CAN*	–	–	–	–	–	*AB*	*SK*	–	–	*QC*	–	–	–	–	–	–	Jiménez et al. 2008b
X. singularis (Ashmead, 1896)	–	*AK*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Jiménez et al. 2008b
Genus *Xyalophoroides* Jiménez & Pujade-Villar, 2008																		
World revision – Jiménez et al. 2008b.																		
X. quinquelineata (Say, 1836)	CAN	–	–	–	–	BC	AB	SK	MB	ON	QC	–	–	*NS*	–	–	–	Jiménez et al. 2008b
FAMILY IBALIIDAE																		
Review and keys to genera and species – Liu and Nordlander 1994.																		
Genus *Ibalia* Latreille, 1802																		
I. anceps Say, 1824	CAN	–	–	–	–	–	–	–	–	ON	QC	*NB*	–	NS	–	–	–	Liu and Nordlander 1994
I. leucospoides (Hochenwarth, 1785)	CAN	–	–	NT	–	BC	AB	–	MB	ON	QC	*NB*	–	*NS*	–	–	–	Kerrich 1973
I. montana Cresson, 1879	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
I. rufipes Cresson, 1879	CAN	–	–	–	–	–	–	–	–	–	QC	*NB*	–	*NS*	–	–	–	Liu and Nordlander 1992
FAMILY LIOPTERIDAE																		
Genus *Paramblynotus* Cameron, 1908																		
Revision and key to species – Liu et al. 2007.																		
P. virginianus Liu, Ronquist & Nordlander, 2007	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
SUPERFAMILY EVANIOIDEA																		
Key to families – Mason 1993.																		
FAMILY AULACIDAE																		
Key to Nearctic species – Townes 1950; key to eastern Nearctic species - Smith 1996a.																		
Genus *Aulacus* Jurine, 1807																		
A. burquei (Provancher, 1882)	CAN	–	–	–	–	–	–	–	–	ON	QC	–	–	*NS*	–	–	–	Townes 1950
A. digitalis Townes, 1950	CAN	–	–	–	–	–	–	–	–	ON	QC	–	–	–	–	–	–	
A. lovei (Ashmead, 1901)	CAN	–	–	–	–	–	–	–	–	ON	QC	NB	–	NS	–	–	–	
A. pallipes Cresson, 1879	CAN	–	–	NT	–	BC	–	–	MB	ON	QC	NB	–	–	–	–	–	
Genus *Pristaulacus* Kieffer, 1900																		
P. bilobatus (Provancher, 1878)	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	NS	–	–	–	
P. canadensis (Townes, 1950)	CAN	–	–	–	–	–	–	–	MB	ON	–	–	–	–	–	–	–	
P. editus (Cresson, 1880)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
P. flavicrurus (Bradley, 1901)	CAN	–	–	–	–		–	–	–	ON	–	–	–	–	–	–	–	
P. foxleei (Townes, 1950)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
P. minor (Cresson, 1880)	CAN	–	–	–	–	BC	–	–	–	–	QC	–	–	–	–	–	–	
P. montanus (Cresson, 1879)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
P. niger (Shuckard, 1841)	CAN	–	–	–	–	–	–	–	MB	ON	QC	–	–	*NS*	–	–	–	Smith 2001
P. occidentalis (Cresson, 1879)	CAN	–	–	–	–	BC	*AB*	–	–	–	–	–	–	–	–	–	–	PMAE
P. pacificus (Cresson, 1879)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
P. resutorivorus (Westwood, 1851)	CAN	–	–	–	–	BC	*AB*	–	–	ON	QC	–	–	–	–	–	–	Townes 1950
P. rufitarsis (Cresson, 1864)	CAN	*AK*	YT	NT	–	BC	AB	SK	MB	ON	QC	NB	PE	**NS**	–	–	–	Carlson 1979b

P. stigmaterus (Cresson, 1864)	CAN	–	–	–	–	–	–	–	–	ON	QC	–	–	–	–	–	–	
P. strangaliae Rohwer, 1917	CAN	–	–	–	–	–	–	–	MB	ON	QC	NB	PE	NS	–	–	–	
FAMILY EVANIIDAE																		
World catalog – Deans 2005, Deans et al. 2023; key to world genera – Deans and Huben 2003.																		
Genus *Evaniella* Bradley, 1905																		
E. semaeoda Bradley, 1908	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
Genus *Hyptia* Illiger, 1807																		
Key to Nearctic species – Townes 1949b.																		
H. harpyoides Bradley, 1908	CAN	–	–	–	–	–	–	–	–	ON	–	–	–	–	–	–	–	
H. reticulata (Say, 1837)	**CAN**	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
H. thoracica (Blanchard, 1840)	CAN	–	–	–	–	–	–	–	–	ON	**QC**	–	–	–	–	–	–	
FAMILY GASTERUPTIIDAE																		
Key to Nearctic species – Townes 1950; key to eastern Nearctic species - Smith 1996b.																		
Genus *Gasteruption* Latreille, 1796																		
G. assectator (Linnaeus, 1758)	CAN	*AK*	–	–	–	BC	AB	–	MB	ON	QC	NB	–	NS	–	*NF*	–	Smith 1996b
G. barnstoni (Westwood, 1851)	CAN	*AK*	–	**NT**	–	BC	AB	SK	MB	ON	QC	NB	PE	NS	–	–	–	Townes 1950
G. floridanum (Bradley, 1908)	CAN	–	–	–	–	–	–	–	–	ON	QC	–	–	–	–	–	–	
G. kirbii (Westwood, 1851)	CAN	–	–	–	–	BC	–	SK		ON	QC	NB	PE	NS	–	–	–	
G. occidentale (Cresson, 1864)	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Townes 1950
G. septentrionale Schletterer, 1890	CAN	–	–	–	–	*BC*	AB	–	–	–	–	–	–	–	–	–	–	Bradley 1908
G. striatum (Townes, 1950)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
G. tarsatorium (Say, 1824)	CAN	–	–	–	–	–	–	–	–	ON	QC	–	–	–	–	–	–	
SUPERFAMILY STEPHANOIDEA																		
FAMILY STEPHANIDAE																		
Revision and key to Nearctic species – Aguiar and Johnson 2003; world catalog – Aguiar 2004.																		
Genus *Megischus* Brullé, 1846																		
M. bicolor (Westwood, 1841)	CAN	–	–	–	–	–	–	–	–	ON	**QC**	–	–	–	–	–	–	QC-BugG
Genus *Schlettererius* Ashmead, 1900																		
S. cinctipes (Cresson, 1880)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
SUPERFAMILY TRIGONALYOIDEA																		
FAMILY TRIGONALYIDAE																		
Revision and key to Nearctic species – Townes 1956; phylogenetic revision, key to genera and and list of world species – Carmean and Kimsey 1998																		
SUBFAMILY ORTHOGONALYINAE																		
Genus *Orthogonalys* Schulz, 1905																		
O. pulchella (Cresson, 1867)	CAN	–	–	–	–	–	–	–	–	**ON**	–	–	–	–	–	–	–	
SUBFAMILY TRIGONALYINAE																		
Genus *Bareogonalos* Schulz, 1907																		
B. canadensis (Harrington, 1896)	CAN	–	–	–	–	BC	–	–	–	–	–	–	–	–	–	–	–	
Genus *Lycogaster* Shuckard, 1841																		
L. pullata Shuckard, 1841	CAN	–	–	–	–	–	**AB**	**SK**	–	**ON**	**QC**	–	–	–	–	–	–	AB-PMAE, SK-RSKM
Genus *Taeniogonalos* Schulz, 1906																		
T. gundlachii (Cresson, 1865)	CAN	–	–	–	–	–	–	–	–	**ON**	**QC**	**NB**	–	**NS**	–	–	–	ON,NB-iNat; QC-LEMQ

Previously, Johnson and Musetti (2004) listed 122 described species (55 Ceraphronidae and 71 Megaspilidae) from North America north of Mexico. The earlier catalogue of the same region by Muesebeck (1979) recorded 109 species (48 Ceraphronidae and 61 Megaspilidae) of which 26 were recorded from Canada (13 of each family) with 1 species of Megaspilidae from Alaska. Masner et al. (1979) estimated that there were 70 species of Ceraphronoidea in Canada (35 in each family). Bennett et al. (2019) revised the number of described species of Ceraphronoidea recorded in Canada to 47 (26 Ceraphronidae and 21 Megaspilidae) meaning that the estimate of Masner et al. (1979) included some unrecorded or undescribed species. Furthermore, Bennett et al. (2019) estimated that there could be as many as 376 species of Ceraphronoidea in Canada (275 Ceraphronidae and 101 Megaspilidae) based on specimens sequenced in the University of Guelph Barcode of Life Datasystems (BOLD) DNA barcode da-

Table 3. Previously published, questionable records from Canada, Alaska and Greenland omitted from the checklist pending confirmation. See Methods for description of acronyms of regions and Figs 1–3 for their locations.

ORDER HYMENOPTERA																		
SUPERFAMILY CERAPHRONOIDEA																		
FAMILY MEGASPILIDAE																		
SUBFAMILY MEGASPILINAE																		
Genus *Conostigmus* Dahlbom, 1858																		
C. canadensis (Ashmead, 1888)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Trietsch et al. 2020
C. harringtoni (Ashmead, 1888)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Trietsch et al. 2020
C. ottawensis (Ashmead, 1888)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Trietsch et al. 2020
C. rufoniger (Provancher, 1888)	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Trietsch et al. 2020
SUPERFAMILY CYNIPOIDEA																		
FAMILY FIGITIDAE																		
SUBFAMILY ANACHARITINAE																		
Genus *Aegilips* Walker, 1835																		
A. aciculatus Provancher, 1881	*CAN*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Provancher 1881
A. victoriae Ashmead, 1896	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Ashmead 1896
Genus *Anacharis* Dalman, 1823																		
A. levifrons Kieffer, 1907	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Kieffer 1907
A. marginata Provancher, 1887	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Provancher 1887
A. mellipes (Provancher, 1888)	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Provancher 1888
A. pediculata (Provancher, 1887)	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Provancher 1887
A. subcompressa (Provancher, 1881)	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Provancher 1881
SUBFAMILY ASPICERINAE																		
Genus *Melanips* Haliday, 1835																		
M. iowensis Ashmead, 1887 Previous literature records may refer to other genera or species.	CAN	–	–	–	–	–	–	–	*MB*	–	–	–	–	–	–	–	–	Batulla and Robinson 1983
SUBFAMILY CHARIPINAE																		
Genus *Alloxysta* Förster, 1869																		
A. halli Andrews, 1978	*CAN*	–	–	–	–	*BC*	*AB*	–	–	*ON*	–	–	–	–	–	–	–	Ferrer-Suay et al. 2013
SUBFAMILY EUCOILINAE																		
Genus *Didyctium* Riley, 1879																		
D. ruficorne (Ashmead, 1887)	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Nordlander 1981
Genus *Gronotoma* Förster, 1869																		
Generic concept and species checklist – Buffington 2011.																		
G. canadensis (Ashmead, 1887) One variable species or species complex.	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Ashmead 1887
Genus *Hexacola* Förster, 1869																		
H. minimum (Provancher, 1883), comb. nov. = *Kleidotoma minima* Provancher, 1883	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Burks 1979
Genus *Kleidotoma* Westwood, 1833																		
K. alaskensis (Ashmead 1902)	–	*AK*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	USNM
K. americana Ashmead, 1887	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	USNM
SUBFAMILY FIGITINAE																		
Genus *Figites* Latreille, 1862																		
F. inermis (Provancher, 1887)	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Provancher 1887
Genus *Lonchidia* Thomson, 1802																		
L. hirta (Provancher, 1887)	*CAN*	–	–	–	–	–	–	–	–	–	*QC*	–	–	–	–	–	–	Provancher 1887
Genus *Sarothrus* Hartig, 1840																		
S. canadensis Kieffer, 1907	*CAN*	–	–	–	–	–	–	–	–	*ON*	–	–	–	–	–	–	–	Kieffer 1907
S. nasoni Ashmead, 1896	*CAN*	–	–	–	–	*BC*	–	–	–	–	–	–	–	–	–	–	–	Ratzlaff 2018
Genus *Zygosis* Förster, 1869																		
Z. laeviscutum (Provancher, 1887)	*CAN*	–	–	–	–	–	–	–	–	*ON*	*QC*	–	–	–	–	–	–	Provancher 1887

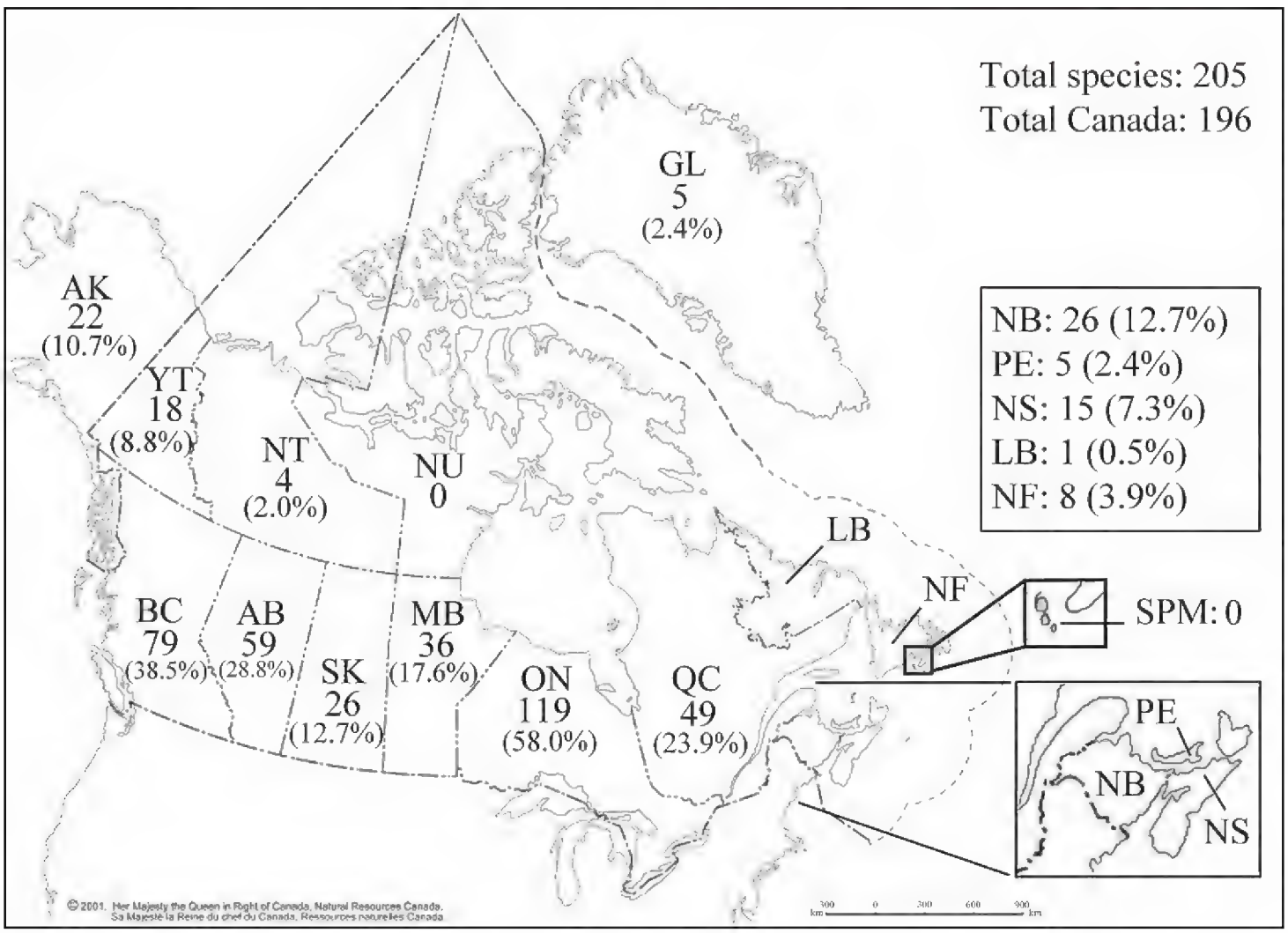

Figure 2. Map of Canada, Alaska and Greenland showing number of described, recorded Cynipoidea species and percentage of total species by region. Canada is comprised of all regions except for Alaska (AK), Greenland (GL) and St. Pierre and Miquelon (SPM). See Methods, Presentation of data section for all acronyms of regions treated in the checklist.

tabase. This implies that based on specimens in BOLD, there are 7.8× as many species of Ceraphronoidea in Canada as there are currently recorded (10.2× for Ceraphronidae and 4.0 times for Megaspilidae). This was the second highest value for predicted species versus recorded species of any superfamily of Hymenoptera in Canada in Bennett et al. (2019), after Platygastroidea (14.3×).

Relative to other parts of the Northern Hemisphere, the ceraphronoid fauna of northern North America is similarly speciose/studied versus other large-scale surveys. For example, the survey of the Hymenoptera of Russia (Belokobylskij et al. 2019) lists 77 species of Ceraphronoidea: 39 Ceraphronidae and 38 Megaspilidae (Alekseev 2019) which, given Russia's surface area (17.1 million km^2) equals 4.5 species per million km^2. The comparable number for northern North America (13.9 million km^2) is 3.9 species per million km^2 and 4.9 species per million km^2 for Canada (9.98 million km^2). Surveys of smaller regions/countries in the Northern Hemisphere are magnitudes of size greater, for example, the checklist of the Ceraphronoidea of British and Irish Ceraphronoidea (Broad and Livermore 2014b) lists 94 described species (28 Ceraphronidae and 64 Megaspilidae) which, given the surface area of Britain and Ireland (313,100 km^2), equates to 300 species per mil-

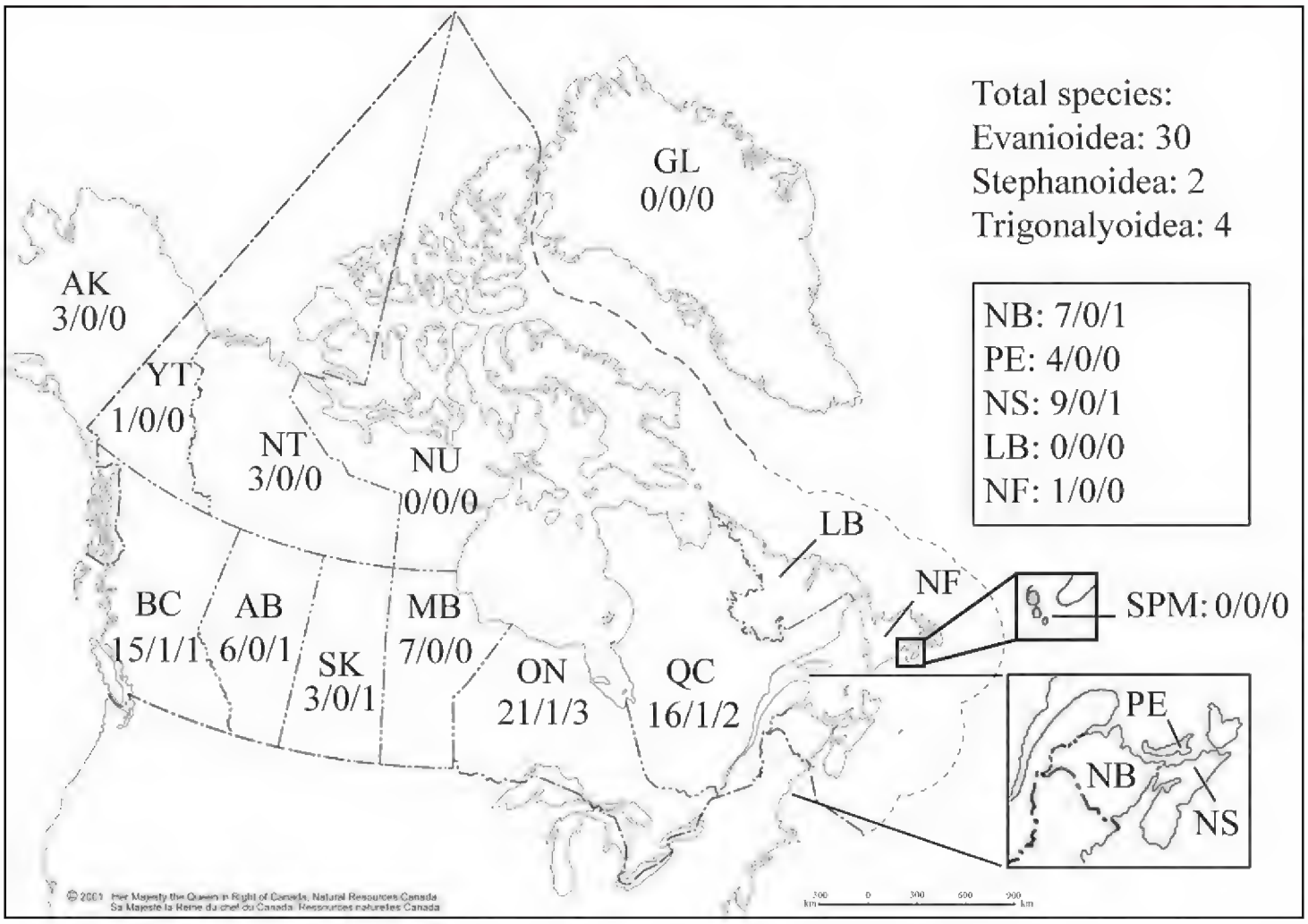

Figure 3. Map of Canada, Alaska and Greenland showing number of described, recorded Evanioidea, Stephanoidea and Trigonalyoidea species. Canada is comprised of all regions except for Alaska (AK), Greenland (GL) and St. Pierre and Miquelon (SPM). Numbers under or beside regional acronyms indicate number of species of Evanioidea/ Stephanoidea/ Trigonalyoidea recorded in each political region. See Methods, Presentation of data section for acronyms of regions treated in the checklist.

lion km^2. Similarly, there are 80 species of Ceraphronoidea recorded in Finland (43 Ceraphronidae and 37 Megaspilidae) (FinBIF 2023a) which equals 230.5 species per million km^2 within a surface area of 338,440 km^2. The trend of higher numbers of species per unit area in smaller regions compared to larger regions is similar to surveys of other Hymenoptera groups (Goulet and Bennett 2021 for sawflies, Huber et al. 2021 for Chalcidoidea) and is a reflection of greater sampling and taxonomic effort in these well-studied countries.

In terms of new records (red records in Table 2), this checklist reported one new generic record for Canada: *Creator* Alekseev (Megaspilidae), although the status of this genus is currently being reviewed and future work may result in its synonymy. There are 13 new Canadian species records of Ceraphronoidea (7 Ceraphronidae and 6 Megaspilidae) (Table 1). No new generic or species records were reported for either Alaska or Greenland. With respect to species richness by distributional area, the political regions with the highest recorded number of species of Ceraphronoidea are Ontario (28 species of 55 total, 51.0%), Quebec (17 species, (30.9%) and British Columbia (15 species, 27.3%) (Fig. 1, Table 1). No other political region has

Figures 4–9. Ceraphronoidea adults **4, 5** Ceraphronidae **6–9** Megaspilidae **4** *Aphanogmus* sp., Canada **5** *Pteroceraphron mirabilipennis*, Canada **6** *Lagynodes* sp., Canada **7** *Conostigmus fasciatipennis* [probably], Niagara, ON **8** *Dendrocerus conwentziae*, Algoma, ON **9** *Megaspilus armatus*, Canada. Photos in Figs 7, 8 courtesy of S. Marshall.

more than six species recorded and several regions (YT, NT, NU, PE, LB and NF) have zero species. The lack of Ceraphronoidea recorded in some regions is almost certainly because of poor collecting effort. The fact that both Alaska and Greenland have recorded species indicates that northern Canadian regions (YT, NT, NU) likely

also have Ceraphronoidea species present. Similarly, Prince Edward Island, Labrador and the Island of Newfoundland should also have species based on records in nearby New Brunswick, Nova Scotia and Quebec.

Cynipoidea

The current study records 205 described species of Cynipoidea in 58 genera in 5 families in northern North America (Tables 1, 2): 89 species of Cynipidae (in 28 genera), 24 Diplolepididae (all in *Diplolepis*) (Fig. 15), 87 Figitidae (in 27 genera), 4 Ibaliidae (all in *Ibalia* Latreille) (Figs 31, 32) and 1 Liopteridae: *Paramblynotus virginianus* Liu, Ronquist and Nordlander (Fig. 33 is likely *P. virginianus*). Canada is home to 196 described species of Cynipoidea (89 Cynipidae, 24 Diplolepididae, 78 Figitidae, 4 Ibaliidae and 1 Liopteridae) in the same 58 genera. Alaska has 22 described cynipoid species (1 Cynipidae, 2 Diplolepididae in 1 genus and 19 Figitidae in 9 genera), and Greenland has 5 species (all Figitidae in 4 genera). With respect to new distributional records of Cynipoidea, the current study reports six new Canadian generic records (all Figitidae): *Amphithectus*, *Cothonaspis* Hartig, *Dilyta* Förster, *Eucoila* Westwood, *Sinatra* Buffington and *Striatovertex* Schick, Forshage & Nordlander as well as 28 new Canadian species records (12 Cynipidae, 3 Diplolepididae and 13 Figitidae) (Tables 1, 2). In terms of taxonomy, two formal changes are proposed. *Kleidotoma minima* Provancher, 1883 (Figitidae: Eucoilinae) is moved from this genus to *Hexacola* Förster, 1869 to form *H. minima* (Provancher, 1883), comb. nov. and *Amblynotus slossonae* Crawford, 1917 is moved from *Melanips* Walker, 1835 (Figitidae: Aspicerinae) to *Amphithectus* Hartig, 1840 (Figitidae: Figitinae) forming *A. slossonae* (Crawford, 1917), comb. nov. In addition, we place the two species of *Xanthoteras* Ashmead (Cynipidae): *X. pulchellum* (Beutenmüller, 1911) and *X. radicola* Ashmead, 1897 in *Xanthoteras* as opposed to *Trigonaspis* Hartig. The taxonomy of *Xanthoteras* and *Trigonaspis* has been ambiguous and future study may result in changes to species placements.

Previous Nearctic surveys of Cynipoidea include Burks (1979) who reported 817 species in North America north of Mexico of which 72 were recorded from Canada: 39 Cynipidae, 11 Diplolepididae (*Diplolepis*), 19 Figitidae (including those species previously classified in Eucoilidae and Alloxystidae) and 3 Ibaliidae. The same survey recorded three species of Cynipoidea (Figitidae) from Alaska and one species of figitid, *Alloxysta victrix* (Westwood), from Greenland. Masner et al. (1979) stated that 150 species of Cynipoidea were present in Canada: 110 Cynipidae (including Diplolepididae), 40 Figitidae (including Eucoilidae and Alloxystidae) and 4 Ibaliidae. Relative to the current survey, these numbers imply that Masner et al. (1979) must have included some unrecorded or undescribed species of Cynipidae in their totals. Liopteridae was not recorded from Canada in Burks (1979) or Masner et al. (1979), but a single specimen of *Paramblynotus virginianus* (now lost) was collected near Hamilton in southern Ontario (Liu et al. 2007). Bennett et al. (2019) stated that there were 127 species of described, extant Cynipoidea recorded in Canada and the species in this checklist form the majority of these records. They estimated that there were 755 species of Cynipoidea in Canada in

Figures 10–15. Cynipidae and Diplolepididae adults **10–14** Cynipidae **15** Diplolepididae **10** *Amphibolips quercusostensackenii* **11** *Andricus quercuspetiolicola*, Fergus, ON **12** *Diastrophus nebulosus* **13** *Aulacidea subterminalis*, Rangiwahia, New Zealand (introduced) **14** *Ceroptres* sp., Cedar Creek, ON **15** *Diplolepis rosae*, Fergus, ON. Photos courtesy of S. Marshall.

the BOLD DNA barcode database which, if representative of the total number of species in the database, means that as of 2019, there could have been as many as 631 unrecorded species of Cynipoidea in Canada. The ratio of the total estimated species to described species in Bennett et al. (2019) was 5.9 which indicates that Cynipoidea was the third

Figures 16–21. Cynipidae and Diplolepididae galls **16–20** Cynipidae **21** Diplolepididae Cynipidae galls **16** *Amphibolips quercusostensackenii* **17** *Diastrophus nebulosus*, Elora, ON **18** *Callirhytis seminator*, Turkey Point, ON **19** *Kokkocynips imbricariae*, Manester, ON **20** *Zopheroteras guttatum*, Ojibway Provincial Park, ON **21** *Diplolepis rosae*, Inverhaugh, ON Photos courtesy of S. Marshall.

most poorly known superfamily in Canada, after Platygastroidea (14.3) and Ceraphronoidea (7.8). Specifically, Cynipidae (including Diplolepididae) had 133 estimated species compared to 62 described (2.1×), whereas there were only 2 species of Ibaliidae from Canada in the BOLD database and no Liopteridae sequences. In comparison, the DNA

barcode data summarized by Bennett et al. (2019) highlights the great undocumented diversity of the family Figitidae in Canada with 620 putative species based on DNA barcodes relative to 60 described (10.3× as many estimated species to described).

Because of the level of uncertainty of species identifications in Figitidae, a subfamily and generic summary is given below to provide an overview of the figitid genera known in northern North America, even if we cannot definitively provide species names within some genera.

Figitidae: Anacharitinae

Within Canada, Alaska and Greenland, four genera of Anacharitinae are known (Tables 2, 3) of eight worldwide (Restrepo-Ortiz and Pujade-Villar 2010). Within the Nearctic region, only *Xyalaspis* Hartig has been revised (Mata-Casanova et al. 2014). *Hexacharis* Kieffer is rare and presently all records of the genus belong to one species: *H. flavipes* Kieffer that is only recorded in the current survey from Alaska (Restrepo-Ortiz and Pujade-Villar 2010). *Aegilips* Walker has several species recorded in Canada; however, revisionary work that has been done remains unpublished and distributional records may change after species concepts are refined. Because of this, the two previously published Canadian species records (Provancher 1881; Ashmead 1896) are omitted from the checklist and included in the list of species of unknown status (Table 3). *Anacharis* Dalman (Fig. 22) also has several species present in northern North America including *A. euchariodes* (Dalman) from Greenland (Vilhelmsen and Forshage 2015) (Table 2), but an unpublished study includes changes to species concepts and new/changed distributional records therefore the other four previous Canadian records are omitted from the checklist and placed in Table 3. *Anacharis* is often commonly collected and its distribution extends into high latitudes. All species of Anacharitinae for which the biology is known are associated with aphid-communities in trees, shrubs and herbs (perhaps most commonly in trees) where they parasitize aphid-hunting Hemerobiidae and Chrysopidae (Neuroptera) larvae (Ronquist 1999).

Figitidae: Aspicerinae

Five genera of Aspicerinae of nine worldwide (Buffington et al. 2020) are known from Canada and Alaska (Tables 2, 3). The subfamily is well-studied relative to other figitid subfamilies. Ros-Farré and Pujade-Villar (2013) revised *Aspicera* Dahlbom although the revision was based on only a small number of specimens, therefore undescribed species may be present and/or species limits may be revised following further study. Ros-Farré and Pujade-Villar (2009a) revised *Callaspidia* Dahlbom (Fig. 23). The only species considered to be found in northern North America is the widespread, but relatively uncommon Holarctic *C. defonscolombei* Dahlbom (Table 2). *Melanips* Haliday has not been revised. Currently, all specimens from northern North America are considered to belong to *M. iowensis* Ashmead; however, it is unknown how many of these records actually belong to this species including the one published record from Canada (Manitoba) by Batulla and Robinson

(1983). Undescribed species and/or unrecorded Palaearctic species are likely present in the Nearctic. *Melanips* specimens are frequently confused with other cynipoid taxa that are matte from dense microsculpture including various Cynipidae and the figitine genus *Amphithectus* Hartig (see below). For these reasons, *Melanips iowensis* is not included in the main checklist (Table 2), but instead is included among the questionable previous records (Table 3), pending further study. Finally, revisions of both *Omalaspis* Giraud and *Paraspicera* Kieffer have been published (Ros-Farré and Pujade-Villar 2011a, 2011b) with two and three species, respectively recorded in northern North America. All species of Aspicerinae for which the biology is known are associated with aphid-communities on herbs, shrubs and trees (most commonly on herbs) where they parasitize aphid-hunting larvae of Brachycera (Diptera) (Ronquist 1999). Most genera are relatively uncommon, except for *Melanips* Haliday. Aspicerinae are more common in open habitats than forests and their distribution does not generally extend significantly into high latitudes.

Figitidae: Charipinae

Charipinae is perhaps the best-studied major subfamily of Figitidae. Four genera of eight worldwide (Buffington et al. 2020) are present in Canada, Alaska and Greenland (Table 2). *Alloxysta* Förster (Fig. 24) is very common and species-rich in northern North America (19 species in Table 2). The genus has been revised in several parts (Andrews 1978; Menke and Evenhuis 1991; Ferrer-Suay et al. 2012, 2013) that in some cases contradict each other. Certainly, there are undescribed Nearctic species and taxonomic changes are also expected. Paretas-Martinez et al. (2011) revised the Holarctic species of *Dilyta* including two species from the Nearctic region, but only one (*D. subclavata* Förster) was recorded from northern North America (Alaska). The current study provides new records for both Nearctic species from Canada. The genus *Lytoxysta* Kieffer was diagnosed by Menke and Evenhuis (1991) and presently all records are considered to belong to *L. brevipalpis* Kieffer. Finally, *Phaenoglyphis* Förster (Fig. 25) is common and rather species-rich in Canada and Alaska (Table 2). It has been revised for the world (Ferrer-Suay et al. 2019); however, it is likely there are still undescribed species in the Nearctic region including the north. All species of Charipinae for which biology is known are hyperparasitoids of Braconidae and Chalcidoidea (Hymenoptera) that parasitize Aphididae and Psyllidae (Hemiptera: Sternorrhyncha) (Ronquist 1999; Buffington et al. 2020). Specimens are commonly collected with distributions extending into high latitudes and are perhaps more commonly found on herbs rather than trees and shrubs.

Figitidae: Emarginine

This monotypic subfamily consisting of *Thoreauella* Girault was previously thought to be found only in tropical regions as well as the eastern Palaearctic (Buffington et al. 2020). More recent collections have found specimens of *Thoreauella* as far north as New Hampshire, so it is possible that future collections will find emarginines in southern Canada.

Figitidae: Euceroptrinae

The monotypic subfamily Euceroptrinae (*Euceroptres* Ashmead) is comprised of four Nearctic species (Buffington and Liljeblad 2008). No specimens have been collected in Canada or Alaska; however, specimens are known from Oregon in the west and Connecticut and Massachusetts in the east, therefore it is quite likely that the subfamily is present in southern Canada, but not yet recorded. Rearing records indicate that the group are parasitoids or inquilines of *Andricus* spp. (Cynipidae) that form galls on oaks (Buffington et al. 2020).

Figitidae: Eucoilinae

As noted above, Eucoilinae is by far the most species-rich subfamily of Figitidae, as well as the most poorly known. There are 91 described genera worldwide (Buffington et al. 2020). Within northern North America, only 12 genera are considered to have described species recorded (Table 2). *Banacuniculus* Buffington was described and revised by Buffington (2010a) and includes four species in Canada, with three species known only in the west (Alberta) and one species with a range extending from British Columbia to Nova Scotia (Table 2). At least a few species of *Cothonaspis* are present in Canada but the lack of a revision of this genus makes it uncertain if these are mainly widespread/ synantropic Holarctic species or whether they are indigenous to northern North America and undescribed. Table 2 lists *C. pentatomus* Hartig as a new generic and species record for Canada (Ontario). *Eucoila* is an uncommon and species-poor genus in Canada but is known to the current authors from eastern Canada. Most or all of the Nearctic fauna is considered to belong to one species: *E. hirticornis* (Kieffer); however, most specimens in collections identified as *Eucoila* actually belong to *Striatovertex* which superficially resembles *Eucoila* but belongs to a different tribe (Schick et al. 2011). *Ganaspidium* Weld was revised by Buffington (2010b) following removal of some species that were placed in *Banacuniculus*. It is not common, but three species are present in western Canada (Table 2). *Ganaspis* Förster is a common and species-rich genus in Canada, but the Nearctic fauna is almost completely unrevised. However, the adventive biocontrol agent reported in the North American literature as *G. brasiliensis* (Ihering) (Abram et al. 2020) has recently been described as a distinct species: *G. kimorum* Buffington (Fig. 26) (Sosa-Calvo et al. 2024).

Both *Hexacola* Förster and *Kleidotoma* Westwood are common and species-rich in northern North America, but both remain completely unrevised in the Nearctic region and therefore most previously published Nearctic records for these genera are listed in Table 3 since they can very rarely be used with confidence and may change following revision. *Kleidotoma* is present in high latitudes including Greenland (Vilhelmsen and Forshage 2015). *Kleidotoma minima* Provancher, 1883 was described from Canada (Ontario) but the type has not been located. Ashmead (1885) made it a junior synonym of *Figites mellipes* Say, 1836 which he moved into *Eucoila*. Ashmead collaborated and exchanged specimens with Provancher so he is expected to have had a fairly good idea of Provancher's species, but we have no good reason why he would have known

the true identity of Say's species. The specimens that Ashmead identified as *Eucoila mellipes* in the USNM are *Hexacola* spp. Thus, we consider *F. mellipes* Say a *nomen dubium* rather than a senior synonym of *K. minima*, and we tentatively make the new combination *Hexacola minimum* (Provancher, 1883), comb. nov., placing it in Table 3 since it is not yet well-known enough to be recognisable at the species level.

Together with *Ganaspis*, *Leptopilina* Förster (Fig. 27) has recently become very important to biological control because of introduction to various parts of the world of the invasive pest, spotted wing Drosophila: *D. suzukii* (Matsumura) (Abram et al. 2020). *Leptopilina* is common and relatively species-rich in northern North America. Unlike *Ganaspis* that is not revised for the Nearctic and has very challenging taxonomy, *Leptopilina* is more well known including a revision (Nordlander 1980) and a more recent review of the species from the eastern United States that includes a species key for the area (Lue et al. 2016). Despite this, additional revisionary work is required for the region. Gariepy et al. (2024) report the presence of some species in Canada that were previously only recorded from the United States.

The monotypic *Sinatra* comprises *S. pacifica* (Yoshimoto) found previously throughout the mid and southwestern United States (as well as Hawaii, the south Pacific and Japan) (Buffington 2011), but is newly recorded from Alberta (Table 2). Museum specimens and previous species records of *Sinatra* are often under the genus name *Disorygma* Beardsley. As noted above, most Nearctic specimens identified as *Eucoila* are actually *Striatovertex*. Three species are newly recorded here from Canada based on identifications by Kathy Schick, but revisionary work has remained unpublished and distributional records may change as species concepts are refined. *Trybliographa* Förster (Fig. 28) is common and species-rich in Canada with some unpublished revisionary work. Some Holarctic species are present in Canada, but most of the Canadian species are undescribed. *Trybliographa simulatrix* (Ruthe) is recorded from both Alaska (current study) and Greenland (Vilhelmsen and Forshage 2015). By far, most of the larger-sized eucoilines in boreal habitats belong to *Trybliographa* and they are often common in collections, sometimes under the junior synonym *Pseudeucoila* Ashmead. Finally, *Zaeucoila* Ashmead is uncommon and species-poor in northern North America with all Canadian records currently considered to belong to *Z. robusta* (Ashmead) and known only from Ontario (Buffington et al. 2017). However, Buffington and Scheffer (2008), in their treatment of the junior synonym *Agrostocynips* Díaz noted that the genus was also known from British Columbia. This record was not included in the later revision of *Zaeucoila* by Buffington et al. (2017) and is not included in Table 2 since the species recorded in British Columbia was not noted.

Six additional genera of Eucoilinae are known from northern North America (*Didyctium* Riley, *Dieucoila* Ashmead, *Gronotoma* Förster, *Quasimodoana* Forshage, Nordlander & Ronquist, *Rhoptromeris* Förster and *Trichoplasta* Benoit), but such is the poor state of knowledge of the subfamily that these specimens remain unidentified at the species level because they represent undescribed species or in some cases, the species and/or generic concepts are unclear so that it is not possible to put names on them until taxa are revised. *Didyctium* Riley is common and species-rich in northern North America, but is completely unrevised, therefore most species are undescribed and the available names can very rarely been used with confidence, therefore the species

Figures 22–27. Figitidae adults **22** *Anacharis* sp., (Anacharitinae), Orton, ON **23** *Callaspidia* sp. (Aspicerinae), near Castlegar, BC **24** *Alloxysta victrix* (Charipinae), Tongapōrutu, New Zealand **25** *Phaenoglyphis villosa*, Makakahi, New Zealand **26** *Ganaspis kimorum* (Eucoilinae), BC **27** *Leptopilina japonica* (Eucoilinae), BC. Photos in Figs 22, 24–25 courtesy of S. Marshall; Fig. 23 courtesy of J. Dulisse; Figs 26–27 courtesy of W.H.L. Wong.

previously recorded in Canada: *D. ruficorne* (Ashmead) (Nordlander 1981) is only included among the questionable records (Table 3). *Dieucoila* is an uncommon genus which, as currently defined, has several undescribed species in Canada. The genus has a great range of morphological variation and its current circumscription actually

includes several undescribed genera. *Gronotoma* is uncommon in northern North America and completely unrevised. Because of this, it remains uncertain whether the single species-level name: *G. canadensis* (Ashmead) (Ashmead 1887) associated with Canadian records (Table 3), is a widespread and variable species or whether it may represent several species. In museum collections, *Gronotoma* specimens are sometimes curated under the junior synonym *Eucoilidea* Ashmead (Buffington 2002). *Quasimodoana* is rare and species-poor in Canada, but undescribed species are present from at least British Columbia and Quebec (Forshage et al. 2008). *Rhoptromeris* is common and relatively species-rich in Canada, but no Canadian records have been associated with a species-level name. *Trichoplasta* is present in Canada, but uncommon and completely unrevised for the region and the several known Nearctic species are all undescribed. All Eucoilinae host records are from cyclorrhaphous Diptera larvae in hidden substrates especially on saprophagous flies in ephemeral habitats (e.g,, dung, carcasses, compost, rotting fruit) or phytophagous flies, especially leafminers (Buffington et al. 2020). Several genera are common in a variety of boreal habitats and the group extends into high latitudes.

Figitidae: Figitinae

Figitinae is much less species-rich than Eucoilinae with the species classified in only 14 genera worldwide (Buffington et al. 2020) of which 4 have described species in northern North America: *Amphithectus* Hartig, *Neralsia* Cameron (Fig. 29), *Xyalophora* Kieffer and *Xyalophoroides* Jiménez and Pujade-Villar (Fig. 30). A further four genera are known to be present in northern North America (*Figites* Latreille, *Lonchidia* Thomson, *Sarothrus* Hartig and *Zygosis* Förster) (Table 3), but these genera either do not have described species recorded from the area or the species concepts are unclear making it uncertain how to apply the few available species-group names. All Figitinae are parasitoids of muscomorphan Diptera (Buffington et al. 2020). The majority of species for which the biology is known parasitize larvae in hidden substrates mostly on saprophagous hosts in ephemeral habitats (e.g,, dung, carcasses, compost, rotting fruit) or in a few cases, phytophagous hosts. Most genera are rare and usually associated with open landscapes, especially agricultural. Only *Figites* and *Neralsia* can be common. The subfamily is not recorded from the high Arctic (Tables 2, 3).

Amphithectus Hartig is uncommon and species poor in northern North America with all Canadian records currently belonging to one species (Table 2). Some *Amphithectus* species superficially resemble *Melanips* due to the matte integument, but differ in many respects, belong to another subfamily, and are perhaps most easy to recognise by the large female metasoma. The type of *Amblynotus slossonae* in USNM is clearly an *Amphithectus* and corresponds to specimens reared from cones in Canada, therefore *Amblynotus slossonae* Crawford, 1918 is moved from *Melanips* to *Amphithectus* forming *Amphithectus slossonae* (Crawford, 1918), comb. nov. *Amphithectus* species parasitize Anthomyiidae flies including seed cone pests such as *Strobilomyia* Michelsen (Forshage and Nordlander 2018) and in this respect, they

have been considered as biocontrol agents. *Neralsia* is common in northern North America and relatively species-rich and a Nearctic revision has been published (Jiménez et al. 2008a) with five species recorded in the area (Table 2). *Neralsia* parasitize calyptrate flies in dung and carcasses. Similarly, *Xyalophora* Kieffer and *Xyalophoroides* Jiménez and Pujade-Villar have been revised on a world level (Jiménez et al. 2008b), although circumscription of the species is still somewhat problematic. Two species of *Xyalophora* are recorded from northern North America and the single species of *Xyalophoroides* is also recorded from the area (Table 2). Hosts of both genera are calyptrate flies in dung and carcasses.

With respect to the figitine genera with problemetic species identifications and limits, *Figites* is seemingly species-rich in northern North America, but remains completely unrevised and it is uncertain how to apply the few available Nearctic species-level names, e.g., *F. inermis* (Provancher) recorded from Quebec (Burks 1979) (Table 3). The genus parasitizes calyptrate flies in dung and carcasses. *Lonchidia* Thomson is uncommonly collected in northern North America and likely has only a few species present. Similar to *Figites*, it is completely unrevised in the Nearctic and therefore it is not clear how to apply the few available Nearctic species-level names, e.g., *L. hirta* Provancher recorded from Quebec (Burks 1979) (Table 3). A revision is required in order to determine to what extent present species are widespread/ Holarctic or endemic to the Nearctic and indeed, very few Canadian records have been associated with a species-level identification. *Sarothrus* Hartig is another genus of figitine that remains completely unrevised for the Nearctic region. Historically, three Nearctic species have been recorded: *S. canadensis* Kieffer from Ontario (Burks 1979), *S. nasoni* Ashmead from Illinois (Burks 1979) and British Columbia (Ratzlaff 2018) (Table 3) and *S. californicus* Kieffer from California (Burks 1979). Similar to *Figites* and *Lonchidia*, a revision is required in order to determine how to apply available species-level names to Nearctic specimens. Lastly with respect to Figitinae, *Zygosis* Förster is another genus that is completely unrevised and therefore it is unclear how to apply the few available Nearctic species-level names, e.g., *Z. laeviscutum* (Provancher) recorded from Ontario and Quebec (Provancher 1887) (Table 3).

Figitidae: Thrasorinae

The final Nearctic subfamily of Figitidae is Thrasorinae which is known only from the southern Nearctic region (two species of *Myrtopsen* Rübsaamen from Arizona) (Ros-Farré and Pujade-Villar 2009b). It is not expected that this group will be recorded from northern North America.

Comparison to Palaearctic Cynipoidea surveys

Relative to surveys of Palaearctic Cynipoidea, the northern Nearctic has less described species recorded. Forshage et al. (2017) listed 220 species of Cynipoidea from Britain and Ireland: 91 Cynipidae (including 5 Diplolepididae), 127 Figitidae and 2 Ibaliidae.

The checklist of the species of Finland lists 205 described species of Cynipoidea: 53 Cynipidae (including 5 Diplolepididae), 149 Figitidae and 3 Ibaliidae (FinBIF 2023b). Sweden has 271 species of Cynipoidea: 66 Cynipidae, 5 Diplolepididae, 198 Figitidae and 2 Ibaliidae (Forshage unpublished). Melika (2019) catalogued the Cynipoidea of Russia, listing 291 described species: 127 Cynipidae (including 9 Diplolepididae), 160 Figitidae, 2 Ibaliidae and 1 Liopteridae. The fact that all four of these surveys include a higher number of Figitidae than Cynipidae corroborates the DNA barcode data of Bennett et al. (2019) that the Figitidae of northern North America are understudied relative to the Palaearctic region.

Cynipoidea distributional summary

The highest species diversity of Cynipoidea is Ontario with 58.0% of the total species (119 of 205) comprised of 57 species of Cynipidae, 18 Diplolepididae, 41 Figitidae, 2 Ibaliidae and 1 Liopteridae. British Columbia is the second most diverse (79 species: 38.5%) and then Alberta (59: 28.8%). In general, Cynipidae is restricted to more southern regions, with no species recorded from the Northwest Territories, Nunavut or Greenland, whereas some species of Figitidae do occur in the Northwest Territories and Greenland (but not yet recorded from Nunavut). Interestingly, one species of Ibaliidae: *Ibalia leucospoides* (Hochenwarth) (Fig. 32) has a range that extends to the Northwest Territories, but otherwise, this family is mostly found in southern Canada. As noted previously, the range of the single species of Liopteridae found in Canada is limited to southern Ontario.

Evanioidea

This checklist includes 30 described species of Evanioidea in Canada, Alaska and Greenland: 18 Aulacidae (in 2 genera), 4 Evaniidae (in 2 genera) and 8 Gasteruptiidae (in 1 genus) (Table 2). All 30 species are present in Canada. Alaska currently has only three species of Evanioidea recorded: *Pristaulacus rufitarsis* (Cresson) (Aulacidae) and *Gasteruption assectator* (Linnaeus) (Fig. 38) and *G. barnstoni* (Westwood) (Gasteruptiidae). There are no Evanioidea known from Greenland.

With respect to previous surveys of Evanioidea in the Nearctic region, the catalogue of Carlson (1979b) listed 54 species of which 24 were recorded from Canada: 16 Aulacidae including 3 *Aulacus* spp. and 13 *Pristaulacus* spp., 1 species of Evaniidae, *Hyptia thoracica* (Blanchard), and 7 species of Gasteruptiidae (all in *Gasteruption*). There was one species of Aulacidae and two species of Gasteruptiidae recorded from Alaska, all of which were also recorded from Canada. Masner et al. (1979) stated that there were 31 species of Evanioidea in Canada (17 Aulacidae, 4 Evaniidae and 10 Gasteruptiidae) but this study did not list species.

In terms of the total number of species of Evanioidea that may occur in Canada, Alaska and Greenland, it is not expected that there will be a great deal more species discovered, but there will likely be some. Bennett et al. (2019) reported that there were

Figures 28–33. Cynipoidea adults **28–30** Figitidae **31, 32** Ibaliidae **33** Liopteridae **28** *Trybliographa* sp. (Eucoilinae) **29** *Neralsia ashmeadi* (Figitinae), Constance Bay, ON **30** *Xyalophoroides quinquelineata* (Figitinae) **31** *Ibalia anceps*, ON **32** *Ibalia leucospoides*, ON **33** *Paramblynotus* sp., White Plains, NY, USA. Photos in Figs 28, 30 courtesy of S. Marshall; Figs 31, 32 courtesy of H. Goulet; Fig. 33 courtesy of C. Holmes.

only 16 Evanioidea DNA barcodes from Canada in the Barcode of Life Datasystems database (6 Aulacidae, 2 Evaniidae and 8 Gasteruptiidae) which indicates that more sampling of Aulacidae and Evaniidae (at least) is required. Carlson (1979b) reported ranges for several evanioid species from northern states bordering Canada, for example,

Pristaulacus fasciatus (Say) is found in Michigan and *P. melleus* (Cresson) is known from Washington state. Both of these species remain unknown in Canada at present. With respect to Gasteruptiidae, *Gasteruption pattersonae* Melander and Brues may be present in British Columbia since it is recorded from Washington state and Idaho. Finally, in terms of Evaniidae, it is possible that one or two widespread species that prey on invasive cockroaches may be present in urban areas of Canada. *Evania appendigaster* (Linnaeus) is known from New York state and Massachusetts and is associated with the American cockroach, *Periplaneta americana* (Linnaeus). *Prosovania fuscipes* (Illiger) is also associated with the American cockroach as well as the Oriental cockroach *Blatta orientalis* Linnaeus and is recorded from Massachusetts (Carlson 1979b).

Comparing the diversity of the evanioid fauna in northern North America to other parts of the Northern Hemisphere reveals a similarly depauperate fauna in Europe and Asia relative to more southern latitudes. Broad and Livermore (2014a) reported only eight species of Evanioidea from Britain and Ireland (one species of Aulacidae, two Evaniidae and five Gasteruptiidae). The inventory of the Evanioidea of Finland (FinBIF 2023c) lists 11 species: 1 aulacid, 1 evaniid and 9 gasteruptiids and the survey of the Hymenoptera of Russia recorded 44 species: 12 Aulacidae (Sundukov and Lelej 2019), 3 Evaniidae (Belokobylskij 2019b) and 29 Gasteruptiidae (van Achterberg 2019).

The current study reports one new generic record of Evanioidea for Canada (*Evaniella* Bradley) (Evaniidae) and two new species records: *Evaniella semaeoda* Bradley (Fig. 36) is recorded from Ontario, previously known from Rhode Island west to southern Michigan (Carlson 1979b). *Hyptia reticulata* (Say) is also reported from Ontario having previously been known from Massachusetts west to mid Michigan. There were no new records of Evanioidea for Alaska.

Stephanoidea

In terms of species richness, Stephanoidea is one of the smallest superfamilies in northern North America with only two species recorded: *Megischus bicolor* (Westwood) (Fig. 40) from Ontario and a new record from Quebec and *Schlettererius cinctipes* (Cresson) (Fig. 41) from British Columbia (Table 2). Previous surveys of Stephanidae from northern North America also only recorded these two species (Carlson 1979a; Masner et al. 1979; Aguiar 2004). No species of Stephanidae are known from Alaska or Greenland. Historically, it appeared as if the two Canadian species were separated geographically with one in the west and one in the east (Carlson 1979a), but more recently, *S. cinctipes* has been collected in the eastern United States: Virginia (Smith 1997), Kentucky (Johansen et al. 2010) and Maryland (Deczynski 2016). The latter study suggested that movement of wood by humans was the reason for the recent range extension of *S. cinctipes* and its Siricidae hosts which raises the possibility that *S. cinctipes* could become established in eastern Canada in the future by similar means. Bennett et al. (2019) reported that there were no Canadian DNA barcodes of Stephanidae in the BOLD DNA barcode database which illustrates the rarity of Stephanidae in Canada despite the large specimen size.

Figures 34–39. Evanioidea adults **34–36** Aulacidae **37** Evaniidae **38, 39** Gasteruptiidae **34** *Aulacus lovei*, Fergus, ON **35** *Pristaulacus strangaliae*, Rondeau Provincial Park, ON **36** *Evaniella semaeoda*, Marriottsville, MD, USA **37** *Hyptia harpyoides*, Rondeau Provincial Park, ON **38** *Gasteruption* sp., [either *G. assectator* or *G. kirbii*], ON **39** *Gasteruption tarsatorium*, Little Current, ON. Photos in Figs 34–35, 37, 39 courtesy of S. Marshall; Fig. 36 courtesy of Z. Dankowicz; Fig. 38 courtesy of H. Goulet.

There are eight species of Stephanidae recorded from North America north of Mexico: seven species of *Megischus* and *S. cinctipes* (Aguiar and Johnson 2003). It is unlikely that any more than two species are present in Canada because none of

the other six species of *Megischus* are recorded in any states bordering Canada – the next most northerly species is *M. californicus* Townes known from southern Oregon (Aguiar and Johnson 2003). Similarly, it is unlikely that *S. cinctipes* will be found in Alaska as the most northerly records for this species are all from southern British Columbia (Townes 1949a).

Stephanidae are much more diverse in southern latitudes compared to northern. There are no species of Stephanidae in Britain and Ireland (Broad 2014) or Finland (FinBIF 2023d). The whole of Europe has only two species of Stephanidae with the farthest north records from Germany and France (Ceccolini 2021). Similar to northern North America, Russia has two species of Stephanidae recorded (Belokobylskij 2019a).

Trigonalyoidea

There are four species of Trigonalyoidea (Trigonalyidae) recorded from northern North America classified into four genera: *Orthogonalys pulchella* (Cresson) (Fig. 42) from Ontario, *Bareogonalos canadensis* (Harrington) from British Columbia, *Lycogaster pullata* from Alberta, Saskatchewan, Ontario and Quebec, and *Taeniogonalos gundlachii* (Cresson) (Fig. 43) from Ontario, Quebec, New Brunswick and Nova Scotia (Table 2). No Trigonalyidae are recorded from Alaska or Greenland. In terms of previous surveys, Masner et al. (1979) and Bennett et al. (2019) reported four species from Canada, but these papers did not list the species. The revision of Carmean and Kimsey (1998) confirmed that these four species were present in Canada, but only listed country distributions, not provinces. The only published provincial record of a Canadian trigonalyid that we could find is for *Bareogonalos canadensis* from BC (Harrington 1896; Townes 1956; Carlson 1979c). The records of ON for *Orthogonalys pulchella*, ON and QC for *Lycogaster pullata* and ON, QC, NB and NS for *T. gundlachii* may have been known previously, but we have considered them as new in order to emphasize the current distributions. The finding that *L. pullata* is present in western Canada (AB and SK) is almost certainly new, as this species was previously only known to us from eastern Canada (based on specimens in the CNC).

With respect to North America, five species of Trigonalyidae are known (Smith and Stocks 2005). The fifth species, *O. bella* Smith and Stocks, is only recorded from the southeast of the United States (Tennessee) and is not expected to occur in northern North America. Four distinct Trigonalyidae DNA barcodes from Canada are present in the BOLD DNA barcode database (Bennett et al. 2019) which corroborates the number of species in Canada. It is unlikely that *B. canadensis* is present in Alaska because in Canada it is only known from coastal regions of southern British Columbia (Harrington 1896; Townes 1956). However, the new records of *L. pullata* from AB and SK demonstrate that this species is more widespread than previously thought and therefore it could possibly be present in Alaska.

Similar to Evanioidea and Stephanoidea, Trigonalyoidea are more abundant in southern latitudes compared to northern. With respect to Palaearctic surveys, there is

Figures 40–43. Stephanoidea and Trigonalyoidea adults **40, 41** Stephanidae **42, 43** Trigonalyidae **40** *Megischus bicolor*, MI, USA **41** *Schlettererius cinctipes*, WA, USA **42** *Orthogonalys pulchella*, Canton, GA, USA **43** *Taeniogonalos gundlachii*, AZ, USA. Photos in Figs 40, 41 courtesy of N. Schiff; Fig. 42 courtesy of C. Butler; Fig. 43 courtesy of S. Marshall.

only one species of Trigonalyidae recorded in Britain and Ireland: *Pseudogonalos hahnii* (Spinola, 1840) (Broad 2014) and this is the same as in Finland (FinBIF 2023e). There are eight species of Trigonalyidae recorded in Russia (Lelej 2019).

Summary

This paper lists the described species of Ceraphronoidea, Cynipoidea, Evanioidea, Stephanoidea and Trigonalyoidea and their distributions in Canada, Alaska and Greenland (Table 2). The Introduction to the checklist series (Bennett 2021) stated that the species in these five superfamilies totalled 237 species (52 Ceraphronoidea, 149 Cynipoidea, 30 Evanioidea, 2 Stephanoidea and 4 Trigonalyoidea) which comprised 2.6% of the total (9250) species. The current total is 296 (55 Ceraphronoidea, 205 Cynipoidea, 30 Evanioidea, 2 Stephanoidea and 4 Trigonalyoidea). The differences in the totals for Ceraphronoidea arise from the following: the revision of *Conostigmus* by Trietsch et al. (2020) that was not included in the totals in Bennett (2021) as well as re-assessment of the validity of several records of *Aphanogmus* Thomson and *Ceraphron* Jurine (Ceraphronidae) as well as the new record for *Creator*. The remainder of the differences between the numbers in Bennett (2021) and the current study belong to Cynipoidea. These arose because of publication of the catalogue of rose and herb gall wasps (Cynipidae and Diplolepididae) by Nastasi and Deans (2021), several other collaborative papers by these authors, a paper on distributions of *Diplolepis* (Diplolepididae) (Zhang et al. 2019), two papers by Earley (2024, in press), several confirmed records on iNaturalist (see acknowledgements) and recent personal collecting by GM. In addition, two papers by David Evans on cynipid galls on Garry oak: *Quercus garryana* Douglas in BC (Evans 1972, 1985) were not considered by Bennett (2021) resulting in the addition of several more species to the Canadian list. Because Evans (1985) was published as an unsubstantiated list of species, only records that could be confirmed by examination of specimens were included and therefore, the following remain unsubstantiated, but possibly correct records for Canada and BC: *Ceroptres montensis* Weld, 1957; *Feron pattersonae* (Fullaway, 1911), *Loxaulus atrior* (Kinsey, 1922) and *Synergus oneratus* (Harris, 1841). Differences in the numbers of Figitidae reported between Bennett (2021) and the current study was mostly due to addition of new records and careful assessment of published records by MF, the latter process resulting in removal of some previous records to Table 3. No differences occurred in Ibaliidae, Liopteridae (or Stephanoidea or Trigonalyoidea). All species and distributions in the current paper will be added to the online checklist of the Hymenoptera of Canada, Alaska and Greenland (Bennett 2024).

The percentage of records of Ceraphronoidea and Cynipoidea that are new to Canada highlights the poor state of knowledge of these two superfamilies in northern North America: 26.5% (13 of 49) of Ceraphronoidea species are new to Canada and 14.3% (28 of 196) of Cynipoidea (Table 1). This is also demonstrated by the presence of unverifiable previously published records in Table 3 (4 Megaspilidae and 19 Figitidae). Distributional surveys of some groups have not been made since the Catalog of Hymenoptera of America north of Mexico in 1979, especially almost all genera in Eucoilinae (Figitidae) and all Ceraphronidae. Based

on the findings of this paper and the DNA barcode results of Bennett et al. (2019) it is clear that much more work is required in these groups (and others) in order to document their taxonomic composition and distributions within northern North America. In addition, the startlingly low number of species recorded from Alaska (only 31 species) and other northern and central areas (e.g., Saskatchewan) highlights the need for much greater sampling in these regions. Nevertheless, this checklist adds greatly to our knowledge and provides baseline data on which future surveys can be built.

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